From Comptometer to AI

History of IT in the UK, a reflection by one who was there

John Chapman

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Forward

Alan Norman

While the computer industry may have begun in the 50s and 60s with the mainframe, it was not until the 70s and 80s that it developed into an industry that seriously impacted everyday business and ultimately personal life. The rapid growth and development that followed over the next 50 years was based on advances in a wide array of processing, communications, storage and networking technologies, some so far-reaching and radical that they revolutionised entire business models. It was a fascinating and revolutionary period of explosive growth and ever-wider distribution of computing power that paved the way for the profound advances in communications and artificial intelligence that surround us today.

John's career spanned all facets of the industry, from engineering, through sales and marketing to general management, consulting, publishing and journalism. As well as giving him the opportunity to actually be involved in many of the key technological changes it

also afforded him with a front row seat for all the major advances surrounding them.

His personal insight into how the UK IT industry developed over the period is fascinating and the personal experiences John weaves into his book add real colour to the story and differentiates it from some of the staid academic histories of IT development. The combination of technology history, market evolution and auto biography make this book both a great read and a great reference document for anybody interested in this period of rapid evolution of IT.

I am also sure it will inspire others to give their insights and perspectives on this fascinating world that now is deeply imbedded in all our daily lives.

Introduction

The real IT Industry started in September 1969 when I left school and joined the world's second largest computer company at the time, Burroughs Machines. Obviously, there were a few companies at the time claiming to make computers but very few of them were known to the general public nor by most companies. Only very large businesses and banks really had any need, or the budget, for the huge computers that filled warehouse-sized rooms.

So how, you may ask, did I identify that the IT industry was where I wanted to start my career.

Well, I must admit I didn't know anything about the industry at the time, and neither did my school's career adviser. I kind of fell into the industry by accident.

As a Grammar school boy in the sixties, and with 9 O-level passes under my belt, I was in my upper 6th year and was eagerly preparing

for university interviews. However lacking experience of presenting myself, I thought it was a good idea to go for some job interviews.

It just so happened that in February 1969, my elder brother and my cousin had both had interviews with Burroughs Machines for an engineering job in Manchester, and both had failed. With bravado I bet them I could get the job. Not having a clue what it entailed.

So, I arrived for the interview on a Saturday. A day late as it turned out. It said Saturday on my letter, but the date was the Friday. Luckily, they worked Saturday mornings, and the branch manager was in.

The interview as it turned out would not have helped me at all with preparing for university interviews. After 5 mins of checking my application form and academic achievements I was taken into a room and sat at a workbench with a mechanical adding machine and given ½ hour to work out how all the mechanisms worked.

After another ½ hour of questions around this I was then given several large a3 sized diagrams which turned out to be logic tests.

Across and down the sheet were linked logic gate diagrams, (and, nand, or & nor gates). I was told how each gate functioned and then when given the plus and minus signals going into the gates on the left hand of the page had to work out whether the signal coming out of the last gate on the right was a plus or minus.

I did not know this at the time, but that is how the internals of computers work. Anyway, it seems that I passed the test with flying colours and was offered the job the following week.

However, as I still held out hopes of getting into university, I had to decline the offer but asked would the job still be open in August if I didn't get the exam results I needed.

They said they regularly had roles coming up so there would be a good chance.

As circumstances would have it, I didn't get the results I needed for university. Probably because I enjoyed my last year at school too much. Rugby Saturday morning, football Saturday afternoon and Sunday morning and afternoon, helping run the local church youth club, acting in plays, competing in debating competitions and getting engaged to my future wife probably not conducive to academic excellence.

Anyway, I called Burroughs the day after my A level results and asked if the job was still open. They said start next Monday, I told them that it was a bank holiday, so I started on the first Tuesday in September 1969.

The 1970s

The Awakening

Like me, most people and businesses in 1969 had no idea what a computer was and what it could do for themselves or their organisations.

However, that was about to change as the 1970s saw the introduction of new electronic products whose many components were the result of the 1960s space race to the moon.

We went from electronic computer logic gates comprised of discreet components like transistors, resistors, diodes and capacitors to integrated circuits and microprocessors in a matter of just a few years.

The change was quite dramatic as we saw early office computers shrink from hundreds of circuit boards, using these discreet components, to single board microprocessor-based computers within a matter of 6 years at the beginning of the 1970s.

To bring this all into context, it is worth looking at what technology was available to businesses in 1970 and what a typical office environment looked like.

When I started working as a 'computer engineer', most companies had no computer technology at all. What they did have were mechanical typewriters, cash machines/tills, adding machines, comptometers, and accounting machines.

There were no calculators, desk computers, or word processors.

Adding Machine

The adding machines were either hand driven or motorized and just used for tallying up figures. If a company needed to calculate numbers, then they would hire a comptometer operator who was trained to use these devices. A comptometer was basically an adding machine that had number wheels in windows at the bottom of the keyboard. The operators were trained to multiply and divide numbers by moving across the columns of numbers.

Comptometer

For example, in organisations like the gas board, where they had to calculate gas bills, they would have large rooms full of comptometers and operators. The role of comptometer operator was highly valued, and each major city would have several comptometer schools to support the demand. It was amazing that by the mid 1970s this role had almost completely disappeared as electronic calculators rapidly took over.

At the start of the 1970s, however, there was one device, first introduced in the 1950s by Burroughs and NCR (the National Cash Register company), that was at the heart of most businesses' computing needs, the accounting machine.

Accounting Machine

This device, made up of hundreds of moving mechanical parts, was part adding machine and part calculator and was used by organisations to produce their invoices, sales and purchase ledgers and incredibly their payroll accounting figures and slips.

The Burroughs Sensimatic accounting machine that I was trained on was an incredible feat of engineering that had a central camshaft driving levers of all shapes and sizes sensing programming from different length lugs on a moving tray at the back of the machine. This program tray would tell the machine whether to add, subtract or multiply the numbers on the keyboard and tell it which of nine registers to store the information in. It could then subtotal or total that registers information and print it on the ledger card or payroll sheet.

This was all mechanical. The only electricity to the machine was to the motor driving the camshaft.

These accounting machines, at the start of the 1970s, were the only computing devices available to most companies and organisations.

Even banks and large organisations like Woolworths, who had their own IBM or ICL mainframes, also had hundreds of accounting machines providing the bulk of their accounting needs. In fact, many of these accounting machines were adapted to include an electronic register to output data onto an attached punch tape machine. The punch tapes were then sent to the mainframe room for processing.

As you can imagine, these accounting machines, with so many moving parts, could be temperamental. This required lots of engineers like me as I was just one of 25 in the Burroughs Manchester office

trained to keep them operating. We also had offices close by in Bolton, Stockport, Liverpool, Chester and Bradford.

These accounting machines really provided the bulk of the UK's computing needs in the early 1970s.

They were also at the heart of a new phenomenon, the datacenter. At Woolworth's datacenter in an old cotton mill in Castleton near Rochdale, the ICL mainframe only took up a fraction of the floor space allocated to adding machines, comptometers and accounting machines.

One floor had up to 100 accounting machines processing data and generating punch tape to be fed into the mainframe. The noise in that room could be deafening though probably not quite as bad as when the cotton mill had been in full operation a century before.

However, as I found out, while replacing the site engineer while he was on holiday, the noise was not the only problem in the datacenter and particularly on the accounting machine floor. With 100 women in one room, I soon learned that if I dropped a screwdriver, I needed to kick it back to my office before attempting to pick it up.

So, as well as providing the bulk of the UK's accounting processing needs the accounting machine had also, since the mid 1960s, been at the heart of the idea to bring proper data processing computing to small and medium sized business.

Both Burroughs and NCR decided to bolt onto their accounting machines, a computer module, to process the data faster than sending punch tape to a mainframe datacenter.

These early desk-sized computers effectively used the accounting machine for inputting data and printing ledger cards. The Burroughs ones that I worked on had between 400 and 800 circuit boards in the main processing unit, all using discreet components, no chips.

These units had 48k of core memory, the only other storage being on magnetic strips on the back of the ledger cards. Input and output devices included a punch card reader, a line printer and a bulk ledger card reader for doing month end trial balance calculations and payroll ledger card analysis.

Though, by today's IT standards these devices seem like the dinosaurs of the industry, they were incredibly productive, bridging the old mechanical and computing age.

Burroughs E 6000

Being an engineer on these complex systems required a six-week training course on practical electronics and a further four-week course on troubleshooting and programming.

If there was a fault on a system, we would have to identify it down to the component on one of the circuit boards and replace it. With up to 800 circuit boards and up to 20 variants, it could be quite tricky.

The flashing lights on the front of these old computers were used by salespeople to show customers how hard the computing element was working but for us engineers they were a way of narrowing down any fault in the equipment. We would 'single shot', in other words manually generate a clock pulse, to move the computer through a single program instruction to see at what point it went wrong. We would then attach an oscilloscope to the circuit we thought was causing it to trace the faulty card, then down to the individual component on it.

You can thus understand why the training course was so long.

I can still remember the pressure working on these computers at places like the Daily Express Offices in Manchester and Park Cake

Bakeries in Oldham, while hundreds of employees, waiting for their weekly pay packet, were banging on tables in the canteen demanding their wages.

I remember a particular time at the Daily Express offices, when we had an awkward situation. As the operator, having keyed in all the payroll information and about to print out the 500 payslips, the system just powered down. The fault was identified in the power supply, and there was no quick fix.

So, after much deliberation a colleague and I decided that drastic action was needed, and we decided to take the core memory stack out of the machine and walk across Manchester and put it into the only other exact model of system within 50 miles. This was highly risky as we were told each core memory stack was paired in the factory to specific driver circuit boards.

These core memory stacks were also very susceptible to magnetic interference and on the ones in this system you could actually see the individual magnetic cores on the memory board and the wires going through them.

Anyway having cleared it with the other company that we could use their system over the lunchtime we walked across Manchester, avoiding any building where there might be strong magnetic or electrical noise, with one of us carrying the core memory in an antistatic bag and the other carrying the payslip paper for the line printer and the punch cards that held the payroll program.

Luckily for us, having not told the customer or our engineering boss what we were doing, everything worked and we were able to deliver the printed payslips to the payroll department within an hour.

It is hard to convey what a momentous thing we did at the time, when you consider how easy it is today to transfer data using memory

sticks and even just a year or two after the event using hard and floppy disks.

So, there we are, this was the computing technology that was available in the early 1970s.

But it was all about to change; chips and microprocessors were already starting to appear, and advances in disk technology, communications and networking were on the horizon.

Already there were early electronic versions of the accounting machine starting to appear using chip technology instead of mechanical parts and most of these early desk computing devices (which were the size of a desk) were snapped up by the banks as branch data entry devices that could communicate via the very first modems to their newly built datacenters. Saving them having to transport punch tapes around the country.

These early desk computers made little impact on the general business market, and anyway they were about to be superseded by the Mini and Micro computers that changed the way all computing evolved over the next two decades.

Early Desk Computer

Welcome the Minicomputer

During the 1960s a small startup company in the USA called the Digital Equipment Corporation (DEC) developed the first viable minicomputer, their PDP 1, which brought computing to mid-size companies as well as regional divisions of large organisations.

Though it took till the late 1960s and the launch of their PDP 8 to gain real acceptance as a major computing alternative to mainframes, DEC really paved the way for the minicomputer age with the ability to support multiple users on the system at the same time with direct access through Visual Display Units.

DEC VDU

During the mid 1970s, DEC was joined by Data General, Prime and Hewlett Packard in the new wave of Minicomputer vendors. These major players revolutionised the IT industry and brought major computing power to small and medium sized businesses.

In a matter of a few years, they decimated the traditional market players including Burroughs and NCR who by the end of the decade were just a shadow of their former selves.

These minicomputers got everywhere. As well as replacing the traditional accounting systems they were used in scientific establishments, education, manufacturing and most unlikely, as front-end processors to mainframe computers.

Their ability to handle multiple user inputs and process raw data before it was transferred to the mainframe was a real bonus to large companies.

In fact, my next career step was into this world of minicomputers as front-end processors to mainframes.

I left Burroughs in 1976 to join a Canadian company who had created a key-to-disc solution using a DEC PDP 11 minicomputer.

DEC PDP 11

I was stationed as a site engineer at Shell's datacenter in Wythenshawe, Manchester. Here, the company installed 3 PDP 11 computers with 30 VDUs attached to each. During the day, the 90 data entry operators entered information from Shell's 'Agency Card' slips, sent in by individual petrol stations.

Twice a day, the information was processed, analysed and corrected before being transferred to magnetic tape reels which were then sent to the mainframe room for batch processing.

My role was to keep all three systems running and check, test, and service the equipment every evening.

With minimal training I learnt a lot very quickly on the job. Most importantly, it introduced me to the world of hard disks.

Hard disk storage, which has been critical to the development of the IT industry, was really in its infancy in the early 1970s. I remember visiting the Midland Bank computer center in Bootle when I first started at Burroughs in 1969 and being shown, by a proud mainframe engineer, the first hard disc he had installed. This unit stood nearly 4ft high and inside was a 3ft high hard disc mounted vertically. Apparently, it was mounted vertically because its weight would cause the disc surface to bend if mounted horizontally.

And according to the engineer, the storage of this device was an incredible 1Mb.

So, when I was first introduced to the equipment at Shell, I was astonished to not only find we had 9.6Mb of storage on each of the 3 machines, but that they came in exchangeable 10 disk, 20 face platters.

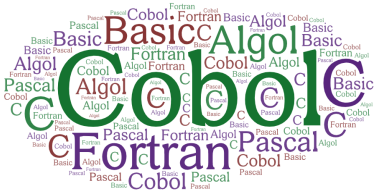
Disc Platter

I rapidly learn't that replaceable storage, which was all the rage on these minicomputers, could be rather tricky to align, adjust and calibrate. Particularly if the customer wanted to move them from one system to another. Also, if not handled properly and installed accurately they had a tendency to crash, which was not just expensive in replacing the disc packs and new read heads, but created a screaming noise that could be heard across the whole building.

The most important aspect of the minicomputer era is that it spawned the growth of new programming languages, the evolution of software companies, and most importantly IT services organisations.

At the beginning of the 1970s there were just a small number of mainframe companies providing batch processing systems. The advent of the emerging minicomputer manufacturers and the markets they sold into required software and operating systems that could cope with the many and varied uses that companies wanted to put them to.

During the mainframe domination throughout the 50s and 60s all hardware and operating systems were proprietary to the manufacturer but there emerged a small number of programming languages such as Fortran, Cobol and Algol which were supported by all manufacturers, and which enabled software developers to create new solutions for the end user.



The advent of the minicomputer accelerated the development of software languages with Basic, Pascal and C being the most well-known. However, the minicomputer manufacturers carefully protected their proprietary hardware and operating system designs with their own versions of the programming languages. Thus, software companies had to compile their programs for different manufacturers' systems and were often controlled by those particular manufacturers if they wanted to be on their preferred software list.

In the early days of minicomputers, all systems were sold by the manufacturer. However, that changed very quickly as their sales teams realised the potential to set up their own companies on the back of the massive demand from end users for computing power.

This led to the first evolution of the IT channel. Initially, because minicomputers were quite expensive, these channel pioneers set up computer bureaus offering payroll and accounting services to companies large and small. This allowed them to taste what computing was about, and most of the mid-sized companies then went on to buy their own systems from the computer companies running these bureaus.

However, these new minicomputer sales companies needed to get some independence from the stranglehold that the vendors had over them. There was obviously an advantage to working as an extended arm of the hardware manufacturer's sales team, but they needed to create their own identity and have their own USPs.

They achieved this by creating their own software teams to develop bespoke solutions for their clients and then often spinning off these teams into a separate stand-alone software company. Thus evolved the first independent IT channel.

It would take till the late 1980s for these computer manufacturers to move away from their proprietary hardware and operating systems. Unfortunately, some of them failed to survive long enough.

One of the minicomputer manufacturers, now hardly remembered, Wang Laboratories took a completely different stance in the marketplace. Coming from the early typesetting marketplace, they identified a huge opportunity in corporations for a word processing computer system.

Their minicomputer could support up to 16 word processing terminals linked to a centralised disk system and a specialised printer. The systems could also be linked together with proprietary networking technology.

Wang Word Processor

Wang had hit a real sweet spot in the market and by the early 1980s hit annual revenues of $3Bn and employed 33,000 people worldwide. They filed for bankruptcy in 1992 as PCs with word processing software took their market completely away.

In this minicomputer era you might wonder where the UK and European manufacturers were. Well, they had a significant presence in the UK particularly Siemens and Nixdorf from Germany and Olivetti from Italy. All made strong inroads both in direct sales and through the fledgling channel community.

ICL, the only real British manufacturer of mainframe computers, really struggled financially throughout the 1970s and only entered the minicomputer marketplace by acquiring the non-US part of Singer Business Machines, which gave them a reasonably successful System Ten minicomputer.

There was one British player however who played a significant part in the minicomputer market during the 1970s and 80s, Systime Computers Ltd of Leeds founded by entrepreneur John Gow. Systime became the second largest British computer manufacturer by building their systems around components from other manufacturers particularly DEC.

Systime pioneered the role of OEM (Original Equipment Manufacturer) in the IT industry. This OEM model, of taking products from a number of manufacturers and creating solutions incorporating all these components with your own software applications, has stood the test of time throughout the following decades, accelerating rapidly in the microcomputer age.

The early Human Interaction

As we came into the 1970s, the way programs and data were entered into computer systems was either via a keyboard 'Teletype' mechanical device, punch cards or punch tape. The human interaction we have today only started to emerge in the age of the minicomputer via VDUs.

The visual display unit, VDU, with direct access to the computer, emerged in the early 1970s and would go on to be the primary interface for programmers and data entry operators for the next 20 years.

The VDU in its design was quite simple and mimicked the punch card by having a screen of 80 characters in length, with either 24 or 25 lines on the screen. There were no graphics at this stage; it was just a device to talk to the computer.

However, as was usually the case in the 1970s, each manufacturer developed their own VDU and had their own proprietary way of communicating between it and the computer. This proprietary nature of what was in effect a volume market, by the mid 1970s, enraged customers who were being charged exorbitant amounts for what was basically a simple device.

Thus, emerged the start of an explosion of peripherals manufacturers who by software could emulate the different protocols used by the minicomputer manufacturers.

Televideo, ADDS, and Wyse were the primary VDU manufacturers in this period, and all would have a significant input into the development of the microcomputer.

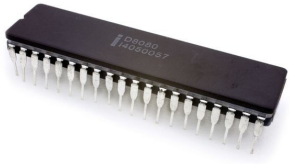
Start of the Microcomputer age

By the mid 1970s chip manufacturers, particularly Intel, had achieved a significant milestone by reducing the core processing unit of a computer onto a single piece of silicon, the microprocessor. In a matter of a few years, we went from hundreds of circuit boards with discreet components to a single chip.

This single step would prove to be the most significant advance in computer technology, starting a revolution that would bring computing to every one of us.

But let's not get carried away. The Microcomputer took quite some time to take off. There was no channel to market, no agreed operating system, and practically no programming languages or application software.

Peripherals were also an issue. What do you input data via, how do you store information and how do you output to a printer. The processor had suddenly got smaller; peripherals hadn't.



Intel 8080 Microprocessor

So, there were a few essential issues that needed to be resolved before the microcomputer could take centre stage.

But before that, how did I get involved in the microcomputer space.

Well, after 18 months looking after the systems at Shell, I decided I needed to advance my career and applied for one of two engineering jobs going at DEC's northern office. Despite over 100 applicants I got offered one of the positions. However, before leaving I heard that the sales director of my existing employer was also leaving to set up the UK microcomputer arm of ADDS, the VDU manufacturer.

I also understood that he was looking for an engineer. I quickly made an excuse to visit the company's office and asked him if I could apply.

2 weeks later I was on a plane to the US to get trained on one of the first commercial microcomputer systems.

On the course I was not only introduced to the new electronics surrounding the microprocessor but also microchip memory and floppy disk storage.

For the first time I realised that this new IT world was a software world. Without diagnostic software, it was impossible to fix these systems. No buttons to step through instructions and diagnose faults. The world of the microprocessor was dynamic and real-time.

However, these early microcomputers were not the single board systems that we know now. There was a chassis containing several 12" circuit boards, one microprocessor board, 3 x 16k memory cards, 2 X disk controller cards, 3 x communications cards and a peripherals card.

This chassis was contained in a full-sized desk that also had 2 x 8" 250k floppy disk drives and a character-based VDU that ADDS were famous for.

This ADDS System 70, ran an operating system called CP/M, which was the standard for all microcomputers till the advent of the PC at the start of the 1980s. At first the System 70 had only one programming language that was proprietary to ADDS and only enabled programming of data entry applications on the screen.

The reason for this was that initially the System 70 was designed as a key to disk data entry solution for mainframe and minicomputers. The operator would key in and verify the data that was then stored on floppy disks. The System 70 could then transfer that data to the host system via a modem.

ADDS's background in selling VDUs in this market gave them the ideal way to get a foothold in this new microprocessor world. The System 70 had lots of communications protocols, including IBM 2780 and 3780 built in, to access both the mainframe and minicomputer markets.

All our early sales were in this data entry market however that changed rapidly once we got access to a program language called BASIC, provided by a new start-up company called Microsoft.

Suddenly we had the opportunity to show what a microcomputer could do.

Our programmer wrote a sales, purchase and nominal ledger using Basic, and we took it to the only IT channel around at the time, the minicomputer sales and bureau companies.

We showed them that here was a device that could allow them to penetrate a huge potential business market. Not only could it be used as a data entry device for their smaller customers but also as a stand-alone computer for those who wanted more control.

At a time when most early microcomputer manufacturers were struggling to find more than a hobbyist market, we had a system we could take to a broad range of businesses.

Our most successful channel partner at the time was ACT, a large computer bureau based in Birmingham. So successful were they that they started to set up their own smaller resellers and created their own accounting software. Within 18 months they were so enamoured with the Microcomputer world and its potential that they put in a bid to buy ADDS.

When this offer was declined ACT set off to develop their own microcomputer, resulting in the ACT Sirius 1 and then the popular British made Apricot PC in the early 1980s.

Early competitors to the System 70 were the Commodore PET and the Intertec Superbrain. The Commodore PET made some early inroads into business and introduced computing to a broader population of computer enthusiasts. The Superbrain took significant steps in the UK business world but eventually failed due to reliability and support issues.

Commodore PET

So, around 1978 you could definitely say the microcomputer had arrived and found a place in the UK business market. However, the 'big guns' of the industry still saw this market as tiny and insignificant.

This was about to change as microprocessors got more powerful, and we went multi-user.

All the early successful microcomputers used the Digital Research's CP/M operating system, which was single-user. In around 1977, Digital Research announced their multi-user version of CP/M, MP/M which would run on the two most successful microprocessors, the Z80 and Intel's 8080.

This was a real game changer enabling the microcomputer to appeal to a broad range of businesses and give software companies a greater opportunity to develop more comprehensive application suites.

Superbrain

ADDS were an early entrant into this multi-user world with their Multvision systems. Alongside them was a new entrant Altos, founded by British born entrepreneur, Dave Jackson.

ADDS Multivision

These new 'multiuser micros' made significant inroads into the UK IT market and between them really established the first IT channels in the UK.

Though these two manufacturers' products were limited in the number of users they could support, due to the processing power of the early microprocessors, they rapidly created a significant market for

themselves with small to medium businesses and had suddenly woken up the possible opportunities for the fledgling IT channel.

Altos ACS 8000

So much so, that the minicomputer vendors were starting to take heed, and even the big mainframe players were starting to twitch.

But before we come to a close and summarise what happened in the 1970s, it would be good to understand what had been going on behind the scenes and would have a major influence over the IT industry in the coming years.

I will cover this by looking at the following developments:

Storage Technology

As I mentioned earlier, disk technology in the early 70s was limited to physically large hard disks and slightly smaller multi-platter disk packs. The size of these disks was a result of the technology used which required the read head to float on a cushion of air generated by the speed of the disk rotating.

Thus, the read head had to wait until the disk got up to speed before it could engage with the disk and float above. Crashes were a regular and expensive result if the read heads came in early, or the disk slowed down.

There was also a battle of the air pressure of the disk spinning pushing away the read head from the surface and the springs on the read head trying to keep it close enough to read and write data onto the magnetic disk. This meant that disks had to have hard thick surfaces to survive any crashes, which also meant that the read head and the oxide on the disc were far apart, reducing the disc capacity.

IBM Winchester 30-30

In the mid 1970s, IBM came up with the solution with the Winchester 30-30 disk drive, which allowed the read head to sit on the disk surface and float close to it when the disk was up to speed. This technology totally revolutionised the disk storage market. With the closeness of read head to disk, and the disk surface not having to be tough and thick, the storage capacity of disks rocketed, and the size shrunk exponentially.

By the end of the decade, the new microcomputers could have 5Mb of hard storage on a 5" disk.

Across the same period, we saw floppy disks arrive in both 8" and 5 ¼" versions as well as Dynamic Random Access Memory (DRAM) replacing core memory in all mainframes, and minicomputers, as well as being an essential part of the microcomputer revolution.

Peripherals

The only I/O products available for the industry at the beginning of the 1970s were mechanical teletype devices, punch card and punch tape machines, early VDUs, line printers and electric golf ball typewriters.

Other than small matrix printers for Mini and Micro computers there were few obvious developments in the peripherals market, however behind the scenes things were moving.

R&D work at Xerox Parc on their "Office of the Future" featured the graphical user interface (GUI), the mouse, and the laser printer; all would have a fundamental effect on future generations.

Communications

At the beginning of the century almost all communication between computers and between peripherals and their host computers were by either teletype fixed connections or teletype over simple modems.

Some of the major mainframe companies had their proprietary network systems between their own systems, but the communications networks we know today were a long way away.

However, the invention of Ethernet, again at Xerox Parc, would start to make inroads in the minicomputer world by the end of the decade and during the 1980s become almost the defacto standard networking for the industry.

Summary

The 1970s were a period of great change, not just in the IT industry but right across all aspects of life. The revolutionary aspects of the 1960s showed everyone that there were alternatives to traditional ways of doing things. That followed throughout the 1970s as people awakened to what was now possible.

No more so than in the IT industry, where new technology opened up a whole new world of possibilities and started a revolution that has led to today's personal assistant, cloud computing and AI based world.

I was very lucky to have joined the IT industry in 1969 just as it was all about to fundamentally change. I was particularly lucky to be closely involved with much of the change, as it happened.

But by the end of the decade, I had made a change myself. Having reached the heady heights of European Engineering Manager for

ADDS, looking after my own engineers in the UK plus supporting 10 distributors across Europe, I decided on a career change to sales.

Although offered roles outside ADDS, I stayed with them as Northern UK sales manager, selling the Multivision microcomputer to its resellers. This was a great start to my selling career supporting these fledgling resellers from Birmingham to the north of Scotland.

Outtakes

ICL

In my career throughout the 1970s I had little interaction with ICL except when being called into their Manchester headquarters to re-program a 2-register adding machine they had lying about their offices so that they could input 2 columns of figures from a huge mainframe printout.

It seems that the ICL programmer had forgotten to total up the columns, and it was going to be 3 days before they could get access to the mainframe to rerun the corrected program.

It was cheaper and quicker to get me to quickly program the adding machine and then get in a temp to spend 2 days re-keying in the figures, remembering to regularly subtotal.

On recounting this story over the years to industry people, they would nod and offer their equally bizarre stories of dealing with ICL over the period.

Yugoslavia

In the early microcomputer era one tended to take sales wherever the opportunity arose, and one particularly attractive deal came the way of ADDS UK within a year of the launch of the System 70.

We were passed a lead from our parent company in the US, from a Yugoslavian insurance company who wished to buy 50 System 70s as data entry devices at their branches across the country to communicate with their IBM mainframe in Novisad.

To prove it would all work, a System 70 was shipped to Yugoslavia, and I was dispatched to prove that it would communicate to their mainframe.

However, I did not fly to Belgrade, the nearest airport to Novisad. Instead, I arrived late one evening in Zagreb, now capital of Croatia, and was driven up to Ljubljana, now capital of Slovenia, where the test was to be carried out.

We were so late arriving in Ljubljana due to thick snow, that the driver could not drive back the same night. We ended up sharing a room as there were no other vacancies at the hotel.

I awoke the next morning to find that the driver had left leaving a note of the address of the company I was to visit. Getting directions from the hotel receptionist, I walked across town with my tool bag and a heavy line monitor (a device with a small 6" screen that could read and display the characters going on the communications link between machines).

On arrival at this company's office, I found that the System 70 was soaking wet as it had been left outside at the airport for a few days before being shipped to Ljubljana.

I spent two hours with a hairdryer before even trying to switch on the machine.

Once up and running, we quickly connected the System 70 to a DEC PDP 11 to prove that we could transfer data in simple teletype mode. Everything worked fine.

However, when we tried to communicate using IBM 2780 protocol, which would be essential when connecting to the insurance company's mainframe, the PDP 11 just powered down. It turned out that the IBM 2780 emulation program for the PDP 11 had only been written the day before by the local technical college.

I spent the next 24 hours at the company offices, sleeping overnight on the couch in reception, while the programmers kept rewriting their code. We never got it to work.

A couple of weeks later I came back to try again though this time at the Army and Police datacenter in Zabreb. Here they had a similar IBM mainframe to the insurance company.

We were allocated 3 specific times during the day where we could test the communications link. The first time it didn't work. However, I had my line monitor connected and noticed that they were using a slightly different option that we didn't support, so I asked them to reconfigure the IBM front-end processor to match our system.

This they claimed to have done, but it did not work on the second attempt.

Finally, I got the IBM manual out myself and found it was one character change on one punch card on the program deck that needed changing, and I did this myself using an old hand punch. I gave the new card to the operator and told him which card it replaced in his deck.

However, I saw him smile and switch cards before inserting into the program deck. And guess what, it didn't work. I realised then that It was never going to work, as IBM did not want the insurance company to buy our System 70 as it was much cheaper than their own solution.

We eventually proved the case by inviting the insurance company's program team over to Edinburgh where one of our customers was doing exactly what they wanted to achieve. So we eventually got the order.

However, doing the deal in those days with a communist country was not so easy. Firstly, it had to get past the US legal issues of selling advanced technology to an Eastern country, and once that had been agreed, finding a way of helping the company find the Western cash to pay for the deal.

There were also shipping agents, local dealer agents and a Swiss company to buy the plastic buckets that would generate the cash. All in all, the end customer paid 5 times the ex-factory cost of the 50 systems.

So there we were a sizeable order, what could go wrong?

All 50 units were shipped, 40 out to branches around Serbia and 10 in their head office for training of engineers and branch operators. And a bonus, the units were shipped with new double-sided floppy disc drives, giving them twice the capacity they ordered.

So, I went across to train their engineers and our software demonstrator to train the operators.

The first issue I had was that not all their engineers spoke the same languages. Two spoke English and Serbo-Croation, 2 spoke only Serbo-Croation, 2 spoke Serbo-Croation and Hungarian and 2 spoke only Hungarian. So, when I was describing how the circuit boards worked, I would have to sit down while my words were translated into Serbo-Croation and then from Serbo-Croation to Hungarian.

As you can imagine they eventually had to get rid of the Hungarian engineers who really didn't have a chance.

My second major issue was when going through the practical side of the course; the floppy disks were giving errors after being in the drives for only 30 minutes.

My colleague also reported problems with disks not reading while doing her operator course.

Each of us had only taken 2 boxes of floppy discs with us, so we needed to urgently find out what was causing this.

Trying to understand what was going on while 8 engineers were firing questions at me was troubling and at one point after lunch my colleague barred the door so that nobody could get in the room while I was searching for answers.

Suffice it to say that the problem was 3-fold: the double-sided disk drives were scratching the oxide off the disc surface, the physical chassis was made of plastic causing adjustments to easily go off registration and the electronics on the disc driver card did not have enough compensation for out of tolerance read heads.

It took nearly 6 months going back and forth to Yugoslavia 'smuggling in' spare parts to replace faulty read heads and making electronic adjustments before we came up with the final solution, which was to replace the disc drives with another manufacturer.

It seems ADDS in the US had just launched the double-sided drive version of the System 70 when suddenly the manufacturer of the disc drives Shugart, pulled out of the market. So, to fulfill our order, they turned to their backup supplier Memorex.

When Shugart finally relaunched their double-sided drive, as apparently the world expert, I was called over to the US to run tests on both manufacturers' disc drives. With a week's worth of test results I joined ADDS President for a meeting with Memorex's President to share our findings.

It was the shortest meeting I have ever attended. Memorex's President walked into the room, put his hands up and said, 'if you don't sue us, we will take back all the product'.

The next day Memorex closed down their floppy disc drive factory.

The 1980s

The Transformation

Introduction

We left The History of IT Part 1 at the end of the 1970s with the minicomputer starting to dominate, the microcomputer emerging as the new thing for first time computer users and very small businesses and the Multi-user micro emerging as a real alternative to the minicomputer for small to medium business users.

Moving into the 1980s everything was about to accelerate, but there were still great battles to be fought, new business models to trial and huge new entrants about to make their mark.

Throughout Part 2 we will follow not just the technology revolution that was gaining momentum but also how application software became the driving force behind IT adoption and the how the IT channel evolved to create the pathway for vendors to deliver their products to market,

Challenge to the minicomputer

At the beginning of the 1980s, Altos started to dominate the emerging multi-user microcomputer market. Though it had strong competitors like Convergent Technologies and ADDS, all running the MPM operating system, Altos not only had a more stable product but most importantly in the UK a strong distributor, Logitek.

Sensing a real opportunity, I joined Logitek in 1980 as their employee no 6, a move that was to change and accelerate my career in sales exponentially.

Logitek was founded by entrepreneurs Jim Pickup and Peter Warburton who had started a small personal computer reseller in Preston in the 1970s and then spotted the opportunity to import the more powerful Altos multi-user system to the UK.

They both realised that there was a unique opportunity here and quickly got on a plane and flew to meet Yorkshire born, Dave Jackson, CEO and founder of Altos at their premises in Silicon Valley. They came back to the UK with a sole distributor agreement for Altos systems after placing a significant order.

Realising that they had better scale up quickly to sell what they had already ordered they employed their first salesman/Sales Director Frank Noon, who already had experience selling VDUs to the emerging multiuser microcomputer reseller market.

The timing of the Altos agreement and the recruitment of an incredible team of salespeople and technicians ensured that by the mid 80s Logitek was the no 2 distributor by turnover in the UK, only surpassed by P&P Micros who secured early distribution rights on Apple Computers again in the late 1970s. It was amazing that the two largest distributors in the UK by the mid 1980s were based in the small Lancashire towns of Standish and Rawtenstall.

Anyway, back to the battle that was starting to emerge between the minicomputer and multi-user microcomputer.

Though Altos was doing very well in this space, the fact that these early multiuser micros could only support 3 or 4 users, due to the speed of the 8080 and z80 processors, it limited the market they could attack.

This was frustrating both the early computer resellers and their potential clients who were being pushed to purchase expensive proprietary minicomputers.

There was also the added issue that the MPM operating system was never designed to handle lots of users.

So began the exploration for an operating system for this multiuser micro market that would allow it to challenge the Minicomputer.

There were two immediate alternatives, Unix and a CPM / MPM derivative CPNET.

Unix was an open operating system developed in the US Universities and offered for general use based on the Berkeley Software Distribution BSD Unix version.

The issue was that this version of Unix had to be ported and configured for the specific hardware it was running on. Thus, if the hardware manufacturer modified their version of Unix too much to suit their systems, there was no guarantee that applications running on one Unix system would work on another.

This was almost as bad as the minicomputer proprietary operating systems. In fact, there was a point in the mid to late 80s where there were 38 commercial versions of Unix out there, all based on the original BSD.

Also, this lack of a standard version of UNIX to run on Intel microprocessors really held back the ability of manufacturers like Altos to take advantage of the emerging more powerful 8086 microprocessors.

Eventually Microsoft, who had been developing a version of UNIX called Xenix to run on the Intel chip sets, sold this to a new start-up company, the Santa Cruz Organisation (SCO), part funded by Altos CEO Dave Jackson.

Rapidly SCO Xenix, first available on Altos machines, became the standard Unix version for all '86 based multi-user systems.

I remember talking with Dave Jackson a few years later and congratulating him on his backing of SCO and his lucrative investment. He commented back that it would have been good except that he had been forced to sell his SCO shares to pay off his alimony.

Thus is life.

To just take a step back, you may ask what happened to CPM, MPM and CPNET.

Well, they eventually just disappeared as MSDOS and Xenix just took over the market.

However, they had a last hurrah within Logitek as we were under great pressure from our Altos resellers for a system that could handle many more users.

This pressure caused a split within Logitek between our technical director John Carolan and our technical manager Colin Atherton.

Colin was convinced that waiting for a Unix based solution from Altos was the way to go, whereas John was convinced that Logitek could create its own multiuser system using multiple Intel processor cards running CPM in a chassis and using CPNET to link them all together over the backplane of the chassis.

So convincing was John that the board gave him the go ahead to develop a prototype.

This prototype used a minicomputer standard chassis from Plessey and John, and his assistant George Harvey had it up and working within weeks.

So impressive was it that it was given the name 'Landmark', to show that it was the new way forward. Suddenly we had a 20-user system to challenge the minicomputers, at a fraction of the price.

Everything took off at a pace, and we had our first 10 orders within a month. The most impressive order was for a large steel manufacturing company where the Landmark was running the production control software with multiple sensors and terminals around the large site.

The software was tested to an infinite degree before the Landmark went live, replacing a small Altos system.

Everything went fine for a week or two till an opening instruction to the valve releasing the molten metal from a pipe failed to operate, and the molten steel solidified in the pipe.

The Landmark was blamed, and financial threats ensued. We also encountered other problems with the original 10 systems that had been sold, and everyone blamed the operating system integration that John and his team built. However, they were eventually exonerated when Plessey admitted the problem was in their chassis.

The Landmark was renamed the Landmine, and we all learned a valuable lesson, stick to what you know best. Distribution was our business. We were not a manufacturer or OEM.

Luckily for us and our partners SCO Xenix was a real success on Altos and over the next 6 years Altos reigned supreme in the multiuser microcomputer market.

A great deal of this success was down the relationships Altos built with software developers who appreciated the opportunity to port their applications to a 'standard' version of Unix. Also, as Altos did not sell direct, but via a distribution and reseller channel, the software

companies suddenly had the potential for a whole host of companies out there promoting their products. They were no longer dependent on their relationship with large company salesforces.

The evolution of this software applications market and how it affected the whole of the IT industry is a major story, which I will cover later in this evaluation of the 1980s.

So, let's take a step back and look at what was happening in parallel to the growth of the multiuser microcomputer market, the launch of the Personal Computer.

The arrival of the PC

Since the launch of the first microcomputers in the mid 1970s, the larger mainframe and minicomputer manufacturers looked down with disdain at these ‘toys’ and dismissed them as just for learning about computing, not as serious computing systems.

However, the largest of them all IBM did take them seriously and started to put a plan together to dominate this emerging market. To achieve this, they realised that they had to control and define a standard architecture and operating system. Effectively not just creating a product but a whole ecosystem that they could influence.

Thus, in 1981 they launched the IBM PC.

Fundamentally at the heart of the PC was a new operating system PC-DOS, which had been developed for them by Microsoft.

In 1980 IBM had struck a deal with Microsoft to develop PC-DOS for them, but crucially allowed Mi-

crosoft to licence their own version, MS-DOS, to other manufacturers.

This deal was the key factor that launched Microsoft into industry dominance.

Once the deal was struck with IBM, Microsoft decided not to build PC-DOS / MS-DOS from scratch preferring to licence Q-DOS from Seattle Computer Products and then adapted it to create PC-DOS / MS-DOS retaining all rights to the finished product.

Many people speculate that the amount of time and effort that Microsoft had to dedicate to the development and ongoing support for PC-DOS and MS-DOS at this time was the reason that they sold Xenix to SCO.

If they hadn't done so, maybe they could have dominated the Unix market as well!

So, at the launch of the IBM PC we had a standard operating system that software developers could write to, and a standard physical architecture so third-party developers could build add on PC cards for linking into peripheral devices.

By doing this IBM, with its credibility in the market, could create a whole new technology ecosystem that they controlled or at least highly influenced.

Suddenly there was a flurry of new manufacturers trying to emulate the IBM PC using Microsoft's MS-DOS.

The first ones ignored the physical architecture of the PC, while still claiming they were compatible.

Some of the first of these were the large Japanese electronics manufacturers. One of those was Sanyo with their MBC 555 model, which we at Logitek fully embraced.

I was promoted from northern area sales manager to PC sales manager and given the role of launching the Sanyo MBC 555.

Sanyo MBC 555

Right from the start, the product took off. Resellers who could not match IBM's very strict criteria and commitment to be one of their partners flocked to this first IBM compatible.

We were already used to handling lots of boxes as a distributor not only for Altos but also Wyse, the largest VDU maker worldwide. However, the first delivery from Sanyo totally overwhelmed us.

I can still remember receiving that first shipment which arrived at about 6pm one evening.

Many staff, not just the warehouse people, stayed late to receive the stock. By the end we had not only filled the stores, but every office in the building up to ceiling level.

I remember sitting there with colleagues at 10pm that night feeling exhausted but elated.

That was until our MD, Jim Pickup, surveying the scene turned to me and said, 'I hope you have got orders for this bloody lot.'

Luckily, we had, and we spent the next 4 days shipping them out to an eager fledgling PC channel.

This early euphoria evaporated within months as the definition of being IBM PC compatible became clearer. It was no longer acceptable to just use MS-DOS as your compatibility standard. The market demanded that the physical architecture needed to be compatible if you wanted to take advantage of all the software, add on PC cards, and peripherals that were being developed.

There was, however, one problem with this, the ROM Bios which was proprietary to IBM.

The ROM Bios is essentially firmware stored on a Read-Only Memory chip on a microcomputer motherboard, responsible for the crucial first steps of booting up, performing the Power-On Self-Test to check hardware, and loading the operating system.

To be fully compatible to an IBM PC, and stay legal, you effectually had to emulate the IBM ROM Bios, not using any of IBM's code.

Compaq were the first to develop their own proprietary version, legally reverse-engineering the BIOS for their Compaq portable. The first truly IBM PC compatible portable computer.

Compaq went on to be the major competitor to IBM in the corporate as well as small business market.

All other competitors either copied illegally the IBM ROM Bios code and got sued, or they waited till a company called Phoenix Technologies released their 'clean-room' reverse- engineered BIOS.

Sanyo again jumped the gun and copied the IBM ROM BIOS for their replacement for the MBC555 and got sued. Luckily for Logitek and me as PC product manager, Wyse had just entered the PC market with a fully legal IBM compatible PC using the Phoenix Technologies ROM Bios. And much better looking.

Apple

But before we move on and look at how the PC, Unix and Minicomputer markets developed throughout the 80s, we need to look at the evolution of Apple which seemed at times to exist in a parallel

universe to everyone else but had a major influence in the creative use of computing.

Apple really got flying with the release of the Apple II in 1977 which was the first microcomputer that was not a kit of parts, though it still had interface slots for add-on peripheral cards. As it was a self-contained unit with an operating system that had the BASIC programming language built in, it appealed to the early educational market.

Apple 11e

It also had an add-on Z80 based microcomputer processor card that could run CPM and thus appeal to potential business users.

In fact, when Visicalc spreadsheet software was launched on the Apple II it catapulted the company into the business and corporate markets.

The successful launch of the improved Apple IIe in 1983 was built on a huge library of software and was a favourite worldwide.

In the business world in the UK the Apple IIe was superseded by the IBM PC and its clones.

In response, Apple launched their first commercially available PC in 1983 to use a Graphical User Interface, the Apple Lisa. Unfortunately, while technically groundbreaking, the Apple Lisa was very costly and extremely unreliable. So unreliable in fact that all users of the first version sold were offered a free upgrade to the second version before both were rendered obsolete by the launch of the Apple Macintosh.

The launch in 1984 of the Apple Macintosh revolutionised computing by introducing the first successful mass-market graphical user

interface (GUI), replacing text commands with intuitive icons, windows, and a mouse.

Apple Mac

Though the screen was quite small, the Mac was the first to offer "What You See Is What You Get" (WYSIWYG) editing, featuring high-quality fonts and graphics that revolutionised publishing.

Though the Mac was proprietary in design, going against the move towards industry standards, it was successful in publishing and creative markets with user-friendly software like MacWrite and MacPaint, and later PageMaker.

As comparable Windows on the PC was still years away; the Mac had these markets all to themselves.

However, in terms of volume sales against the PC and its clones Apple were starting to fall way behind. This caused a major rift at board level and ended up with founder Steve Jobs leaving the company to set up his own NeXT Inc.

Outside the publishing and creative markets, Apple really didn't impact the general computer market again till the late 90s with the return of Steve Jobs.

PC Domination

Nobody could have predicted the phenomenal growth of the PC market but with IBM giving it credibility, companies and individuals flocked to take advantage of its potential.

What really accelerated its uptake however was software applications, particularly for the Office.

Lotus 123 spreadsheet software on the PC did what VisiCalc had done for the Apple II only on a much greater scale. Lotus was quickly followed by word processing software like Wordstar, EasyWriter, Wordperfect and Microsoft Word.

This combination of office productivity packages drove the PC, not only into the corporate world, but into every business, school, and home.

In particular, the PC appealed to computer programmers who started to write software for all types of businesses. Many of these software developers started selling PCs as well, and many existing PC resellers employed their own software teams to develop applications.

Suddenly a whole new channel ecosystem was developing, but these fledgling companies did not know of each other except if they met at manufacturers' events. There was no internet or web pages to lead potential partners or end users to the source.

So, we at Logitek, spotting an opportunity, became the first company in the UK to compile a list of application software for the channel that ran on both PC MS-DOS platforms and the Altos Xenix platform.

We then ran a series of roadshows for resellers to promote our manual of software applications on the platforms we distributed. The range of software included everything from a single user rabbit breeding application on the PC to multi-user accounting suites on Altos.

The Channel

Before I move on to look at software in more depth and the explosion of networking and communications that took computing to the next level, I would like to focus on the IT channel that emerged in the 1980s.

Distribution

The application manual and series of roadshows I just mentioned accelerated Logitek's position in the market and showed that distributors, with their breadth of knowledge, cross platform experience and channel reach were going to be fundamental to the growth of the IT market.

At the beginning of the 1980s there were few distributors in the UK, Logitek with Altos, P&P with Apple, Northamber with peripherals and Thame systems with components were probably the only notable companies.

The launch of the PC clones changed this dramatically as these emerging contenders needed representation in the UK to introduce their products. Distribution was the ideal route for these 'newbies' if they were to compete with IBM and Compaq.

However, IT Distributors in those early days were far more than the warehouse and credit providers that they were often portrayed as.

Distributors in the 1980s were real market makers for manufacturers, representing them to the channel and then with the channel to end users. They also provided all first line support to their channel partners, gaining more experience than the manufacturer in the actual deployment of their products.

At Logitek we represented our suppliers at meetings with government and industry bodies, to gain access to major markets. We also had our technical managers on boards such as the European Unix Users Group.

It should not be underestimated either the role that distribution played in the early financing of the channel.

One has to remember that the majority of resellers in the early 80s were start-up businesses. There was no credit history of these companies, and no credit factoring facilities or insurance for Logitek and our contemporaries to fall back on.

As orders started to get bigger and risks increased our credit manager was on the road with the salesmen 3 or 4 days a week ensuring we understood the resellers business, the types of deals they were doing, the payment terms they were offering their customers and most importantly their cash flow situation.

We also on occasion had to support them on bids into major companies whose purchasing supplier criteria they did not match.

If you add into this financial support the fact that the financial markets and exchange rates were volatile in this period, $ to £ exchange rate fluctuated from 2:1 to 1:1 and back to 2:1 in one year, you can see that distribution had to be as much financial institution as technology company to survive. Our finance director became an expert at judging when to buy forward in dollars.

I will tell you more about what I feel made Logitek special in the Out Takes section at the end of this session on the 1980s. You will almost certainly recognise some of the Logitek names who went on to major achievements in the industry.

Resellers, Dealers, Vars, Systems Integrators and ISVs

The 1980s was really when the IT channel properly formed giving vendors a route to market and most importantly for end users a skill-base they could tap into to meet their growing need for computer solutions.

At the beginning of the 1980s there were probably less than 100 computer resellers working on the high street selling early microcom-

puters and not that many more acting as agents or resellers for the minicomputer manufacturers.

This was all about to change with the launch of the PC, and the emergence of Unix on the Multi-user micros, and later, on minicomputers.

The launch of the IBM PC amazed everyone, not by its cleverness, but by the fact that there was an open common standard and that IBM had chosen to sell it through a reseller channel as well as direct to its major customers.

It was this openness to allow third-party hardware manufacturers to develop add on cards and their keenness to use the channel to get to areas of the market their direct sales teams couldn't or wouldn't want to access, that was such a change of IBM strategy.

Also allowing Microsoft to supply MS-DOS to its potential competitors seemed like a strange thing to do, especially when you consider the way all the major mainframe and minicomputer manufacturers loved the proprietariness of their systems.

Anyway, IBM did it and started recruiting their IBM PC channel. Suddenly everyone wanted a piece of this. Companies of all types applied to become an IBM PC dealer, from existing microcomputer resellers through to major office equipment companies.

IBM's accreditation criteria and business commitments were stringent forcing many of the smaller channel companies to search for alternative IBM compatible PCs. This was a great period for Logitek with the Wyse PC, which was already an accepted name in the IT industry.

Wyse PC

The launch of the IBM PC really brought out the entrepreneurship of UK businesses. One of the most prominent of these who used the IBM PC to really launch their company was Specialist Computer Centres (SCC).

SCC started out originally in the mid 1970s as SCR (Specialist Computer Recruitment) founded by Peter Rigby, supplying technical and sales staff to the burgeoning minicomputer market. By the time IBM launched their PC, SCC had already expanded into a sales and services IT business, and Peter saw this new opportunity as a way of rapidly expanding his operations.

They set up the first of their computer centres in Birmingham with a plan to expand rapidly across the UK.

I met up with Peter while he was going through his planning phase for the new business as he was looking for a multi-user micro running Unix to sit alongside the IBM PC as his flagship offering to the mid-market clients looking to computerise their accounting operations.

Having presented the Altos system as the best solution for him, I got down to the final 2 potential suppliers.

So, the big day came to present our business case. We were in the morning and our competitor in the afternoon. I took our Sales Director Frank Noon with me as I knew it was likely to come down to margins at the end of the day.

Having done our presentation and travelling back up to Standish, Frank apologised to me because he was convinced, we had lost the deal because he wouldn't budge on margins.

I assured him that he had done the right thing. All the SCC forecasts on numbers were great, but to date they had not sold one. We could not justify giving them a better margin than our other channel partners in case SCC used that margin to undercut them.

Anyway, after a nervous few days I got the call from SCC that we had won. Peter apparently was very impressed with our channel integrity, and he particularly appreciated our knowledge of the market and how we could help them in the early stages as they built their new business identity.

SCC's turnover is now £3.519 billion. From little acorns!

There were many competitors out there for SCC in the corporate PC market including Comptacenter, MBS (Micro Business Systems), Granada, Mitec, Microdrive, and SHL Systemhouse. The list could go on for pages, but I would like now to look at the channel in a more rounded fashion to show how channel companies evolved.

The channel in the early 1980s was very much about IT supply first and support services second. This is where the terms reseller and dealer came from.

Once the volumes started to grow, however, margins for just supplying product reduced rapidly, with those with the highest volumes getting the best discounts, leaving the rest really struggling.

There were also not a lot of services that the resellers/dealers could add to bolster their margins. The intelligent ones thus turned to their application knowledge and software development to extend their appeal to clients.

Many also focused on vertical markets, becoming expert suppliers to markets such as solicitors, the health service, local government, and education. And in trying to differentiate themselves in the market and create a value to big suppliers based on their software and services rather than just numbers, they started terming themselves as VARs (Value Added Resellers).

The term VAR lasted for many years to describe those in the channel that sold solutions, not just hardware.

Another new term emerged at this time, the ISV (Independent Software Vendor), which was used to describe companies that developed software for specific markets rather than general packages like word processing.

Many ISVs were either spin off companies from a VARs software division, who felt they could access more markets by supplying multiple other VARs, or they often were a complete change of direction for a VAR who saw software as the main part of their business.

The number of ISVs grew rapidly as the demand from end users for solutions to their business issues grew exponentially in the late 1980s.

The final channel business model to emerge in the 1980s was that of Systems Integrator, a term that defined companies that were experts in computer infrastructure installation and support.

This role did not really exist till the era of networking, servers and communications, so it makes sense now to look at the first of those and how it changed computing forever.

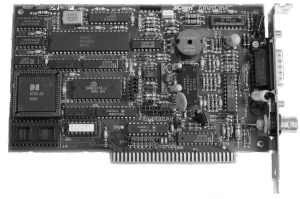
The Network

From the early days of computing, manufacturers had been enabling their systems to talk to each other using serial connections or proprietary networking technology.

However, during the 1970s and 1980s a real need emerged for some standard networking technology to connect the range of different computing devices that organisations were deploying throughout their businesses.

In the late 1970s Ethernet, developed at Xerox Parc, emerged as the front runner and 3Com, founded by Bob Metcalf, one of the inventors of Ethernet, launched its range of Ethernet cards for the minicomputer market.

3Com found a ready market and grew rapidly, and when IBM launched their first PC, 3Com was the first company to produce a PC networking card.



3Com 3C501

Before I go on to explain how the networking market grew in the UK, I would just like to explain a little bit about how Ethernet evolved as a technology and about the 'Protocol Wars'.

Ethernet was created in what the industry described as the 'Seven Layer' model. Rather than explaining in detail these seven layers, mainly because though I was nicknamed the Seven Layer King in the channel at the time, I have forgotten most of it now, I will split it into 3 layers for explaining quickly how it evolved.

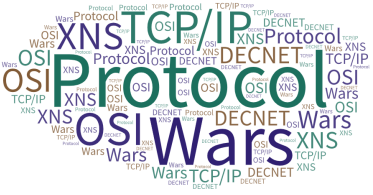
The bottom 2 layers define the physical connection between devices, the middle 3 layers are the transport protocols, and the top two layers are to support the application.

To visualise it in terms of using a telephone, the bottom 2 layers would be dialing the number and connecting the two physical ends, the middle layers would be what language are both ends speaking, and the top layer is what are you talking about. Without all 3 layers being compatible, it is impossible to have a conversation.

With Ethernet the bottom two layers were well defined and supported by all manufacturers and in its first iteration ran at 2Mbps over either thick or thin Ethernet cabling.

The protocol wars

However, the transport layers were where there was a major battle brewing. Ethernet was originally released with the transport protocol XNS (Xerox Network System) but the American government and institutions preferred a protocol called TCP/IP which had been developed for Arpanet, the network that was created to connect US government organisations, including US Universities and the U.S. Department of Defense.



DEC, the largest minicomputer manufacturer, then developed its own DECnet protocols to connect their PDP11s together both over Ethernet but also over wide area connections.

So, in the early 80s we had 3 major Ethernet transport protocols vying for dominance and it was important for the growth of seamless networking between different vendors systems that everyone agree on one protocol.

However, there was great disagreement, as major corporations fought to protect their investments.

Then, Governments worldwide started to pile in as well, proposing a new protocol altogether OSI (Open Systems Interconnection). This signified how important seamless networking was to everyone.

All the major nations then produced their own GOSIP(Government OSI Project) papers and meetings were held in exotic locations around the world to align and agree the OSI standard.

The importance of OSI was brought home to me when I visited GCHQ to try to secure an order for 3Com for all their PCs. The meeting went well except that I had to get agreement from 3Com that they would release the code to them held in the ROM of the PC Ethernet card for security reasons, and secondly that they would confirm 3Com's strategy for moving to OSI.

The first part 3Com agreed to straight away as they already had to do that for the US defence department, The second part was a bit trickier as it meant me meeting up with a government team in Norwich to present the 3Com OSI strategy. The plus side would be, if all went well, that 3Com would become the preferred vendor for Ethernet cards across government.

3Com sent me all the presentations they had used to get accredited for OSI across the world and I dutifully studied them ready for a meeting which had been set up by our technical manager at Logitek, Colin Atherton, who already knew the government team in Norwich as he was on the same European Unix User Group as some of its members.

So, we set off for our 5-hour trip from Standish to Norwich, arriving in time for a nice pub lunch with the government team. At 2 pm we all gathered in their meeting room, and I launched into describing what 3Com's vision of what OSI comprised and their plans to implement it.

I soon ran into problems as the government's team leader started to pick holes in the main diagram I was using, saying that certain elements were on layer 2 or 3 not 4.

Eventually I realised I was out of my depth and then suddenly the rest of the attendees all burst out laughing. It seems that Colin had already sent them the whole presentation and they were perfectly happy with 3Com's strategy.

It also turned out that the main person I was presenting to had written the UK GOSIP paper.

I had been set up!

I thought I was a clever dick. Colin was actually the clever dick!

It took me a while on the 5-hour trip back to see the funny side of it.

Anyway, back to the protocol wars.

In the middle of these protocol wars IBM launched a completely different networking technology to the world, Token Ring.

This threw a major spanner in the works. Here was the world's largest computer company saying that Ethernet was not good enough for 'real' computing and that their Token Ring technology was far superior and would enable a faster and more deterministic delivery of data in high performance computing.

What IBM failed to realise was that, though they had forced a standard for personal computing on a willing world, the networking world was one of many vendors, and interconnection was not one they could control.

IBM thought they could use the protocol wars on Ethernet to take control of this burgeoning market.

They were wrong, and Token Ring only had any traction in organisations that were all IBM. The speed issue also didn't stack up in the real world as Ethernet moved up to 10Mbps and higher very quickly.

The protocol wars finally ended because of 3 factors: the OSI standard took too long to be agreed upon, in its the absence TCP/IP was rapidly becoming the easiest route for most vendors as there were no licensing issues and then Sun Microsystems, who had started to dominate the new UNIX based Workstation market included TCP/IP as standard and also gave free of charge to the world the Network File System (NFS), a client/server distributed file system protocol, that

allows users to access files on a remote server over a network as if they were local.

Suddenly Ethernet and TCP/IP had won. For end users, this was a great step forward enabling wide adoption and leading the way to the future of the internet.

Growth of Networking and Ethernet in the UK.

You may have asked yourselves how I had suddenly gone from PC sales manager to negotiating with government on networking standards.

Well, soon after Logitek got involved in the PC world our Managing Director decided that we should also become a distributor of peripherals like printers and add on electronic components like hard disks,

So, he recruited a salesperson from Thame systems who was a hard disk expert and secured deals with not only hard disk manufacturers but also 3Com who had just launched their first Ethernet card for the IBM PC, the 3C501.

It became quickly apparent that the new salesperson knew nothing about the emerging Ethernet market which was tremendously frustrating for my fledgling PC sales team who were being asked daily for networking cards.

After much badgering and after 6 months of very few sales, Jim pickup eventually gave me the chance and put 3Com products in my team.

I got the impression from the start that he didn't fully trust me as he also attended my first 3Com Worldwide distributor conference in Paris as an 'observer'.

At the 3Com conference the major French distributor Metrologie won the Worldwide Distributor of the Year award, and I with great

bravado told Jim that I would win that award for him next year. Which I did, and also the following year.

However, getting there was quite a struggle. Firstly, we recruited a small team of salespeople and set up a series of 10 roadshows around the UK to recruit these new PC resellers.

At these roadshows we had to explain in detail what Ethernet was, how it worked, and how we would help them sell it to their clients. Jim, being still slightly sceptical, turned up at a number of these sessions.

We started to make some headway in the market but kept coming up against Novell who not only were first in the market in the UK with PC networking cards but also had software called Netware which used a proprietary server that allowed networked PCs to share files and peripherals.

I realised that we had to get traction and credibility for 3Com very quickly and I approached 3Com to ask if Bob Metcalf, the founder of 3Com and inventor of Ethernet, would be willing to come across and give a talk on the future of networking to major UK CIOs and computer resellers.

Bob agreed, as long as we took him for dinner at Langham's the night before.

So, we agreed dates, and Paul Trowbridge, employee number 3 at 3Com UK, and I set to finding the right venue which proved very tricky. It appeared that we had chosen the same date that IBM had to launch their PS2.

It was such a major launch for them that they had booked quite a number of venues in London to present their new product.

We had to do something special to get the attention of our potential audience, who had all been invited to the IBM events.

Remember, there were no electronic databases in those days that we could buy and no email addresses. For the channel we had our

own accounts database but to reach CIOs we had to trawl through Computer Users Yearbook and manually extract names and addresses.

We struggled at first to come up with a compelling reason why our target audience should come to us rather than attend the IBM events.

I eventually decided on a very simple strategy and hoped that it would work.

I put together a single page invite that included Bob Metcalfe's picture and CV and asked if they would like to hear about the future of networking from the guy who invented it.

We then kept our fingers crossed that they would turn up.

Paul Trowbridge, from 3Com, took the astute decision to professionally video the presentation so that we could send it out in VHS tape format to all those on our list who couldn't attend. It proved a masterstroke.

On that day we still got an audience of 200 CIOs in the morning and 150 resellers in the afternoon. Bob's Presentation was tremendous, and his predictions on the future of networking all came true.

Following this launch and the mailing out of the video, we were inundated with leads for new resellers and corporate enquiries. We ended up over the next 18 months doing around 100 roadshows to resellers and then with them to their end users.

We doubled our sales team and ended securing large deals with the likes of the Stock Exchange, Barclays Bank and quite a number of the UK's top 250 companies.

All these deals went through our channel partners, securing us as a trusted supplier to them.

We ended that first year as 3Com's Worldwide Distributor of the Year, and I was presented with the award at a ceremony at Bob Metcalfe's mansion in Silicon Valley.

On Monday morning after arriving back I walked into Jim Pickup's office in Standish and handed him the award, as I had promised I would 12 months before.

He grudgingly put it alongside his Altos sales awards in his trophy cabinet. I suppose none of us like showoffs. However, he did acknowledge the work my team had done as I was promoted to Divisional Director of the new network division.

Getting back to the story of the evolution of Ethernet and the Network market, the final few years of the 1980s saw an unprecedented explosion of Ethernet adoption with the technology being built into many products and the speeds of Ethernet going from 10 to 100 and then 1000Mbps.

The move to Ethernet switching that started to appear in the late 1980s to replace the traditional Ethernet hubs I will leave to part 3 of my History of IT as Its impact and the emergence of major players like Cisco really accelerated throughout the 1990s.

However, the impact of Ethernet and its adoption changed computing forever and heralded in 2 major new business models that would affect the way organisations use technology right up to today, Network Computing and Client Server Computing. But before moving on to describe these I would like to explain how another development had a major influence on their evolution.

The rise of the Workstation

By the mid 1980s we had mainframe computers still serving major organisations. Minicomputers serving the mid-sized companies and multi-user micros bringing computing to SME businesses. We then have the PC starting to dominate the desktop, bringing computing to everyone.

But there was another area of computing which was emerging which would be the catalyst to bring all this together to create the type of computing we all recognise today.

If we just reflect on what the computing of the day was delivering to organisations, we see office automation and productivity tools, accounting and production software, and scientific and vertical business solutions dominating.

But there was one area of computing that was struggling to break out of the stranglehold of the limitations of the technology of the day, and that was the graphical applications world of CAD (Computer Aided Design), CAE (Computer Aided Engineering), high-end 3D graphics, Scientific visualisation and Digital Media and Creative Services.

At the desktop AutoCAD, which at the time featured basic drafting commands enabling 2D graphics, was selling well on PCs, and Apple dominated the creative services market with a range of software packages.

To do anything more exciting you need real high-end computing.

Enter the Workstation, with Sun Microsystems and Silicon Graphics leading the way.

Sun Workstation

What these companies did to effectively bring the power of the mainframe down to the desktop was to develop the RISC microprocessor. In Sun's case the Sparc processor running their version of Unix, Solaris, and from SGI their IRIS processor running their IRIX version of Unix.

The development of RISC (reduced instruction set computing) processors was key to the development of the workstation.

Prior to this, Complex Instruction Set microprocessors like Intel's 8086 range dominated both the desktop PC market and the Unix multi-user marketplace.

However, these 16-bit and 32-bit microprocessors were not powerful enough to do the calculations needed in the graphical applications world.

By reducing the instruction set in the microprocessor to only what was needed for these applications and at the same time increasing the processing capability to 64- bit the Workstation world exploded.

Sun went from almost nothing to an industry giant in just a couple of years.

Sun workstations appeared everywhere replacing minicomputers like DEC's PDP II by offering high-performance and open-architecture UNIX systems that were more cost-effective for 3D modelling and drafting.

They drove the minicomputer manufacturers almost overnight to adopt Unix instead of their proprietary operating systems.

However, as I mentioned earlier, there was no standard version of Unix, though they all came from the same BSD Unix original. HP had HP-UX, IBM had AIX, Siemens had Sinex, DEC had Ultrix and Sony had NEWS-OS.

Sony was a late entrant into the workstation market trying to use its credibility in the broadcasting and graphics arts markets to win a share of the new Workstation explosion. We at Logitek gained UK distribution rights for the Sony Workstation and after 12 months unsuccessfully trying to sell it through our Unix sales team, I was handed the responsibility.

It quickly became apparent that Sony, just like Sanyo in the early PC market, did not understand the software market.

With around 38 versions of Unix out there in the general market, software houses could not support their applications on all those platforms. It was up to the hardware vendors to encourage and persuade them.

Sony decided their name alone should attract them. It didn't.

Of all the Workstation manufacturers, SUN and Silicon Graphics stood out in the 1980s, SGI because they focused on the emerging Digital Media and Creative services market and Sun because they created a new way of computing alongside their Workstation expertise.

By announcing that "The Network Is the Computer" and making the decision to license NFS freely to the industry, it made networked computing easy and cemented TCP/IP as the necessary, underlying infrastructure, SUN effectively changed the computing world.

This concept of Network Computing also extended to the world of Personal Computers and not just Workstations and Unix mini and microcomputers. Suddenly software developers were looking at ways to implement client server applications where part of the program ran

on the desktop and part on the server; either could be anywhere on the network.

This concept was extended to the graphical interface in the form of X Windows, which had been developed by the Massachusetts Institute of Technology (MIT) in 1984. The X protocol has been at version 11 since September 1987.

With the applications running on Unix servers or workstations, the graphical user interface could run on an X Terminal or PC with X thin client software. The concept is similar to that we all use today with Cloud Computing.

However, in the late 1980s, this was revolutionary and was picked up by all UNIX vendors except SUN who had their own proprietary version called the Network extensible Window System (NeWS).

NeWS was technically better than X Windows, but SUN made the big mistake of not licensing it to other companies, whereas MIT made X 11 free.

This was a critical mistake by SUN.

The beauty of X windows was that when deployed on an X Terminal, all the hard work of processing and displaying the graphical application was taken off the Workstation or Unix server. X Windows also did not define the look and feel of the graphical user interface, so manufacturers and independent software companies could create their own UI.

At this time Logitek became the first distributor in the UK for NCD (Network Computing Devices) X Terminals, which was run by Judith Estrin and William Carrico who joined the company from

3Com about 6 months after its founding as its new CEO and executive vice president.

To launch these new X Terminals in the UK, we demonstrated to our channel partners a typical workstation running a high-performance graphical application and alongside, the same type of workstation running 8 versions of the same application displaying on 8 NCD X terminals. There was no performance degradation.

So Thin Client Computing was born.

Remember this was well before Microsoft's real version of Windows on the PC or when Citrix enabled it to be Multi-user.

So, we reached the end of the 1980s with a new technical computing model, Network Computing, this spawned the rise Client Server and Thin Client computing which gave total flexibility to organisations to deploy their software applications across their entire organisation and to users who never envisaged using computers to do their job.

However, there were limitations due to the architecture of Ethernet networks at the time and the sheer costs of wide area networking. In Part 3 I will delve deeper into how this was resolved.

But finally, before summarising the computing world of the 1980s, I would like to cover the area that users valued most.

Application Software is King.

Office productivity

I have already covered the rise of office automation software on PC systems with spreadsheet and word processing software helping drive their uptake.

However, at the same time in the multi-user Unix market similar software was making an impact led by Uniplex, a suite of office applications, Wordperfect which ran on PCs and Unix, and Framemaker, a publishing system particularly suited to generating technical documentation.

Almost all of the minicomputer manufacturers also had their own proprietary office automation suites and later migrated to industry wide solutions as they adopted Unix.

The final missing piece for the office was email.

Having generated documents and spreadsheets, people obviously wanted to share them, but there was no standard for email in the early 1980s. The mainframe and minicomputer manufacturers had their own proprietary email solutions, IBM with Profs, DEC with ALL-IN-1 and HP with HPMAIL.

Interoperability was unknown as the internet had not fully formed, with only the US ARPANET or in the UK the University network JANET (Joint Academic Network) available to send messages across it was difficult to imagine the internet of today.

At Logitek we used 3Com mail, again proprietary to them, but it supported the SMTP (Simple Mail Transfer System) standard that the US government and Universities supported as well as the UK Universities. We were extremely lucky that because our technical director and one of our technical support teams had come to us from Manchester University, we were allowed access through the JANET network.

Thus, I could send emails to 3Com in the US in the mid 1980s. It would take a day or two to arrive, but it was revolutionary at the time.

There were developments however in standardising email transfer protocols which kind of got caught up in the Ethernet protocol wars. On one side was SMTP with its adjuncts POP3 and IMAP and up against those was X.400, part of the GOSIP OSI proposals.

As in the protocol wars, X.400 lost out because it took too long to ratify.

At last, we had a standard, it just needed the Internet to arrive and the cost of communications to come down to make emails ubiquitous.

So, office productivity was covered but what about the rest of the applications world.

Accounting

The major use for computers in business at the beginning of the 1980s was for accounting purposes. Until the advent of the PC the battleground for accounting solutions was the multiuser microcomputer versus the minicomputer.

In the minicomputer world, most of the accounting software was proprietary to individual hardware vendors and was closely prized and protected.

However, with the advent of the multi-user microcomputer firstly with the MPM software and later with Xenix and SCO Unix small to medium sized businesses had access to complete suites of accounting software including sales, purchase and nominal ledgers plus payroll.

This was a revelation to organisations who often outsourced these applications to a computer bureau.

The choice of accounting software on Xenix platforms initially was limited with Tetra, Sun Accounts and Great Plains being the main options. However, following the launch of the PC and then networks with Novell Netware servers, accounting software proliferated.

In the UK companies like Sage, Compact, Peachtree and Pegasus launched their accounts software on the PC platform. Suddenly everyone from sole traders to mid-sized companies could have their own accounting solutions.

As the decade progressed, these companies wanted increasingly more out of their systems, and we saw inventory control, production management and HR functionality added.

With all this functionality we were getting close to the era of true Enterprise Resource Planning (ERP), and in the next part of the History of IT story we will cover the emergence of companies like SAP, Baan and JD Edwards who came to dominate the ERP market in the 1990s.

Before we could get there, however, the accounting software companies needed to move away from their proprietary database structures and embrace the standards starting to emerge.

Companies had masses of information in their accounting systems, however accessing and analysing it was often a tortuous process. Standard database structures like RDBMS on these systems were becoming paramount.

The Database

Well, fundamental to the growth of all business applications was the database. For end users and software developers, the database was the beating heart of their applications.

At the PC level the first and most important of these was dBase from Ashton Tate closely followed by FoxBASE+ and FoxPro and then Paradox. These databases gave end users a tool from which to create their own applications and a platform for the channel of software developers to create bespoke solutions for their clients.

The only issue for database developers was that MS-DOS on the PC was not multiuser and that even using Novell NetWare or 3Com's 3Plus network servers it was difficult to develop truly multi-user business applications.

This is where Unix came into its own as a truly multi-user operating system.

The earliest and most widely adopted database in the Unix world was Informix based on a relational database management model (RDBMS). Originally developed by Informix Corporation, the Informix Software subsidiary was acquired by IBM in 2001.

Informix was rapidly followed in the market by Ingres, Sybase (now owned by SAP) and Oracle.

As a bit of background, the (RDBMS) software model is used to create, manage, and interact with structured data organized into tables with rows and columns. All these major database companies adopted RDBMS as their base platform.

They also all adopted SQL (Structured Query Language) which transformed the way people interacted with data in the mid 1980s. It simplified database management, allowing even non-technical users to write queries and retrieve information efficiently.

The standardisation of SQL in the 1980s allowed for interoperability across different systems and was a crucial development in the growth and deployment of corporate wide business solutions.

Throughout the late 1970s and early 1980s software applications developed on top of these databases were written in 3GL (third Gen-

eration) programming languages such as C, C++, Java, Python, FORTRAN, COBOL, and BASIC.

However, in the late 1980s we saw the emergence of 4GL (fourth generation) languages which are identified as "non-procedural" or "program-generating" languages. In other words, the software developer will tell the 4GL language what they want to achieve, and the 4GL program will go off and generate the program code for the application.

The combination of RDBMS, SQL, and 3GL and 4GL languages gave software developers the tools to develop applications across the new Network Computer infrastructure in either client server or thin client mode.

An enormous change from the siloed applications of the past.

So, this was all great but there was a big 'fly in the ointment' to the full deployment of these applications across an organisations infrastructure. Wide area communications.

Communications deregulation

During the 1980s there were many IT projects cancelled or delayed because the wide area infrastructure was not available, or the costs were astronomical.

I remember looking at the costings of one project that got cancelled and the annual cost of the 2Mb and 10Mb connections between the customers' offices amounted to more than all the up-front costs of Servers, Networks, PCs and application software combined.

The government had realised that this was becoming an issue and as part of its deregulation program to encourage competition decided to create initially a duopoly by licensing Mercury Communications

in 1982 to provide telecommunication services and then it privatised 50.2% of BT in 1984.

The market was also opened up to private equipment providers allowing customers to purchase their own telephones, modems, and answering machines.

Mercury Communications Ltd was formed by a consortium of Cable & Wireless, Barclays and BP and offered fixed leased lines in competition to BT. However, they didn't have the coverage to help SME type companies.

An option at the time, though expensive, was a Microwave leased line. At Logitek we chose this option to link our Standish and London offices, because it gave us 10Mbps instead of the 2Mbps from BT & Mercury. We were only able to do this because we were in line-of-site at both locations to major retransmission stations.

The most beneficial thing that we and other distributors got from this communications deregulation was the rapid growth of the modem market. With deregulation and new international standards, we went from 300bps modems to 2400bps modems in 1984 to 9600 bps before the end of the decade.

The latent desire for faster modems fuelled a growth that saw 3 new distributors established in the UK to meet the demand.

1980s Summary

I titled Part 2 of my personal view of the History of IT, The Transformation, and I hope you can see, having read it, that this period of the 1980s, was when IT really changed into an industry.

As we came into this decade, we had just climbed out of a mechanical world into an electronic one. The 1980s saw the launch of the PC, the move towards standards both in computing and networking

terms, and most fundamentally the evolution of new IT business models.

The 1980s also saw a platform of computing being formed that would pave the way for the Internet and the Cloud. This was truly a transformative period.

The transformation was reflected also at the mainframe market where at the start of the 80s mainframe sales accounted for some 60 to 70% of global hardware revenues, that dropped to about 25 to 30% by the end of the decade.

Mainframes continued however to power just about all mission-critical systems at this time (banking, airlines, government etc.) and still accounted for about 50 to 65% of total industry profits.

The big gainer in terms of revenue share over the period was PCs which went from just 5 to 10% of total revenue in 1980 to about 40 to 50% by 1990. Those sales though were at a much lower margin and accounted for no more than 20 to 30% of industry profits.

Outtakes

The Rise and Fall of Logitek

The 1980s was the most exciting time in the evolution of the IT industry and right at the heart of it was computer distributor Logitek.

How a small start-up company in the late1970s, based in a tiny Lancashire town, Standish, came to be a major player in this era and then fade away to nothing by the early 2000s is a story worth telling. Particularly as throughout its existence, particularly in the 1980s, it

employed quite a number of people who went on to extraordinary prominence in the industry.

I have covered in my review of the 1980s a lot of the history of the company, the products we sold and its achievements, but I would like to fill in the gaps and add a little more colour to the story.

But first and foremost, Logitek from its start was about its people and their characters, and by gum did we have characters.

Besides our MD Jim Pickup, Sales Director Frank Noon and our technical manager Colin Atherton, who have already had mentions in my history of the period, we had many other employees particularly on the sales team who really defined the character of the organisation.

With so many 'characters' in the team there was often a lot of competition and friction.

But hey, you don't get traction without friction.

But let's start at the beginning of the 80s, as Logitek was starting to form.

I was the first salesman Frank recruited to his sales team, and I was closely followed by the recruitment of 2 salespeople and an office manager for our new southern office in a shared mews building in Bayswater, London.

One of those salespeople was Gordon Ruffell who went onto be Southern area sales manager and a stalwart of the company through that growth period.

But it was our next recruitment period that set the tone for the future.

We had just got a distribution deal with Sanyo to add to our Altos and Wyse products.

Frank gave me the role of recruiter in chief for this phase as I was going to be responsible for training them up on our Altos and

Sanyo product ranges and then chaperoning them at their first sales meetings.

The first and most memorable interview was with Tim Goldring, who turned up dressed in a shiny expensive suit with a startling paisley lining. His patter was the in the style of Derek Trotter, but he had the most tremendous grin and twinkle that I couldn't resist. Tim will reappear twice in my review of the 1990s, but I won't spoil that story.

My second recruit was a gentleman called Harvey Hutchinson who couldn't have been more different, very correct in the mould of professional salesperson with a strong CV.

My third choice was between a very professional sales lady and an ex Olympic canoeist.

It was a very close call, and I chose the canoeist, Brian Haynes, who went on to be divisional director of our Peripherals and Component division and years later Sales Director of the company.

Brian was an intriguing character from the start, pushing hard for his company car of choice, a Ford Capri. I realised later why, when I joined him on his first customer visits on his territory, which stretched from London out to Cornwall.

On my arrival at our London office in Bayswater, I spied his Capri with a racing Canoe strapped to the top. For the 4 days of visits, he had booked us into hotels alongside rivers where he could practice in the evening. It appears the Capri was the only car on our company car list that was long enough so the canoe would not overhang.

Anyway, prior to them all joining I had a well-earned holiday arriving back on Monday to start all the product training for our new recruits.

Frank Noon popped into my office to welcome me back and inform me that Altos UK had recruited a new salesperson who was to look

after our account, and they had asked if that person could attend my training course on the Altos products.

I should have known from the grin on Frank's face that something was up. It turned out that our new account manager from Altos was the lady that I turned down in favour of Brian.

An uncomfortable few days. And probably a good move to make me PC product manager soon afterwards.

The next few years saw Logitek grow substantially with the evolution of 3 divisions, Altos Unix which Frank Noon initially ran, Networking which I ran and Peripherals and Components which Brian Haynes ran. This 3-pronged structure gave us both the focus and rivalry to create a very special culture.

Within these teams we had characters who were so strong that many of them went on to greater things in the industry. Probably the most well-known of these were Roger Paul who set up his own distribution company in the early 1990s and later founded Cisilion, now one of the UKs largest Cisco resellers.

Alongside Roger in our London Sales Office was Neil Ledger who went on to found distributors Data Connectivity, equIP Technologies and VADition, all sold to other major international distributors Including the Exclusive Group where he is still a director.

There were other great characters amongst this sales team over the years, too many to mention individually, though if they read this they would be peeved to not be included.

Suffice it to say that many have gone on to run their own successful businesses, as well as populating senior positions at major IT vendors.

This team of salespeople were so successful and so aggressive that when we were all instructed to attend an advanced sales training day as part of preparing to take the company public, they totally dominated the instructor.

The salesmen were split into 2 groups, and the courses were a week apart. On the first course were our senior salespeople who from about lunchtime on the first day realised that they knew more than the instructor.

By the end of the second day, where they had outflanked the instructor during roleplays, the instructor admitted that he had failed as a salesman and that is why he had turned to teaching the theory.

During the second course the following week, Frank Noon, our Sales Director, was called to urgently attend the premises, where he found the instructor in tears having what looked like a nervous breakdown.

This was a signal to us all that we needed to curb our aggressive nature and become more professional. Which is probably why we had all been sent on the course in the first place.

This taming of the sales team had little effect on our performance as a company nor our ability to dominate our chosen markets. If anything, it made us sharper and more competitive.

However, our success was not just down to a great sales team nor great products. The real success came from our all-round support of our channel partners.

Our market making strength of creating major sales opportunities for our channel partners and then supporting them technically and financially to win the deal made us very special in the market.

At the heart of being able to win deals was the technical expertise of our presales team, headed by Colin Atherton and ably supported by George Harvey.

I have mentioned several times earlier in my history of IT in the 1980s Colin's contribution to winning major deals at a technical level, but he was also the beating heart of Logitek, being able to out-party

any of the sales team and still attend early morning meetings, bright as a button.

George Harvey was the complete opposite, quiet and reserved, a collector of Reliant Robin cars, but no less important to the company and its channel partners.

To give you an idea how clever George was and why the channel loved him so much I would like to recount something that happened one evening.

Previously George had written a terminal emulator for the PC which allowed a user to access their minicomputers and even mainframes through the serial port of their PC.

This gave our PC resellers a real advantage in the market as George had included terminal emulations of all the major vendors' own terminals.

However, one afternoon I saw George lose his temper for the first time as he slammed down the phone and cried out, "If I have to tell a reseller how to wire an RS232 interface one more time, I am quitting."

Letting him simmer down for a while, I approached him just before leaving for the evening and asked if it would be possible for him to port his terminal emulator software to run on TCP/IP over the network rather than through the serial port.

By this time, I was running a very successful networking division and could see an enormous opportunity.

He smiled for the first time that day. "I'll look into it," he said.

I came in the next morning expecting to find him enthusiastic with some ideas on how to do it. Instead, I found a smiling, but very tired George, sat ready to show me the complete solution working.

It seems that he had found an open-source version of TCP/IP that his contacts at Manchester University knew about in the US. He had downloaded it via the Janet academic network and then set to work.

He roped in one of his colleagues and our IT manager, Earle Long, whose wide-eyed description of what they had done became legend in the company.

George had networked together in our demonstration room 3 systems. The first to enable him to write the code, the second to compile the program, and the third to test the software linking to Altos multi-user micros around the building and external minicomputers he had access to.

It had taken them all night but by morning it was all complete.

We immediately packaged it and sold it through our channel partners at £50 a seat. Great business and all profit for the company.

Inexplicably after a year or so, our MD sold it to one of our vendors for about £38k.

Not only had we lost a nice monthly income in what was an exploding market, but we also lost one of our advantages against that vendors' other distributors.

Alongside Logitek's product sales we had built a very healthy support and services operation LTSS (Logitek Technical Support and Services).

LTSS was run by Jim Fagan and Andrew Unsworth and provided technical support and maintenance services to our channel. Initially formed to support our Altos resellers, who couldn't afford to employ engineers and keep spares to support their own maintenance contracts with customers. LTSS expanded offering network design and support services through the channel.

LTSS gave tremendous support to the channel and became a fundamental part of our go-to market strategy as well as being a highly profitable operation.

Their success made them a little cocky and in the pub one night Jim Fagan got carried away and challenged the sales team to a game of football to establish bragging rights in the company.

We knew many of his young engineers played in local leagues, and Jim felt confident that he could take us on. He also had them training for weeks before the match at the local sports centre.

We booked Preston North End's ground for the encounter and as the day approached, I published the sales team on the company notice board.

As I was the only one in our team still playing at any reasonable level I felt we needed to get a psychological advantage. The team sheet included Frank Noon, ex Blackburn boys, Roger Paul, ex Streatham and Croydon boys, Mike Heritage, ex professional with Stoke City, Charlie Stewart, ex gym teacher and county level hockey player as well as Brian Haynes, ex Olympic canoeist.

To be fair Brian wasn't very good at football but created havoc as centre forward with his over enthusiastic bundling over of their defence.

Anyway, we trounced them 8 to nil.

Our Finance Director Chris Myers however got carried away with this great result and challenged the company auditors to a match for double or quits for the audit fee.

Suddenly we had a real match on our hands and again we played at Preston North End's ground. We won this 5 – 2 much to the relief of Chris.

The camaraderie that these events signified was right through the company. Though we had divisional and north/south rivalry, we had a very special environment.

This is shown by the fact that wherever and whenever any of us meet up, we slip back into conversation as though many years had not passed.

By the mid 1980s, Logitek was really flying, and our board decided it was time to take the company public. Everything looked great, but it was a decision that in the long run was to pull the company apart.

In preparation for the flotation, all senior managers were sent on professional courses on how to create marketing programs, how to understand company accounts, and how to deliver impactful presentations.

This was all great, and we accepted the company's adviser's requests for these courses as it would add value to the business if we could show the depth of business expertise.

The request that really caused issues, however, was for all senior managers to have psychometric tests to highlight their strengths and weaknesses.

We were all sent to a company in Northwich, in Cheshire, who specialised in these tests for corporate organisations.

It was not doing the tests or their results that caused rifts within the company; it was their interpretation by our MD.

I was lucky, in that I came out second in the IQ tests and overall, according to the final report, the most stable employee in the group.

However, our MD Jim Pickup, tried to make a big thing out of one comment in my report, that I liked to be liked. Jim thought this was a real weakness.

I got off lightly. For some of the employees it effectively cut off their opportunities within the company. Rather than using the report to identify areas where people needed help and training, it was used to identify character defects.

Though the flotation went well, and those of us who had been given shares made a little money, there were a few issues that started to niggle and cause friction where there shouldn't have been.

The first of these was leading up to the flotation, when Jim employed a Commercial Director. None of us understood what that role was, and the person he employed came from one of our competitors who was much less successful than us. He had also just lost his driving licence and the only thing in his briefcase was a rail timetable.

The worst thing though was that he was given 5% of the company, more than Colin and I received, and we had been there from the start.

He lasted 6 months, but it had sown the seeds of distrust in the company. Even more so when Frank Noon found out that he was being paid more than him.

For a while everything carried on OK and we reached an annual turnover of £65M, exceptional at the time considering the size of the UK IT market.

However, there was a major blow to the company when Colin Atherton, our technical manager died suddenly of a heart attack while playing golf.

I had been on holiday and on coming in early on the following Monday morning I saw a big sign on the notice board informing staff of Colin's funeral. I was totally stunned. Colin was only a month older than me and only 38.

To show how respected he was in the company and in the industry, for over 20 years we held an annual golf day in his memory, which was attended over the years not only by his peers in the company but also by some of our competitors from those days.

However, we started to leak really good staff who saw their careers limited by the corporate infrastructure that was being implemented

as the company reported to shareholders and tried to meet their profit expectations.

There was no longer the flexibility that a private company enjoys, and many of our staff moved on to glittering careers elsewhere.

It was when our Sales Director, Frank Noon, left that things started to spiral down.

Jim Pickup started to manage the major supplier relationships, agreeing sales targets and developments that were not feasible or supportive of the business.

Around this time, Logitek made its first corporate purchase of the Advansys Group, which included the networking distributor, Azlan, as well as its own System Integration business.

Following the purchase, my networking division was integrated into Azlan's operations, and I was 'promoted' and given a title that I cannot remember.

Effectively my role was to identify new potential supplier partners/products and act as technical manager of the Altos division.

It seemed a strange move at the time as my network division had 3 times the turnover of Azlan, as they had been struggling even as Novell's top distributor.

Apparently, Dave Randall, MD of Azlan, had convinced Jim Pickup that he could grow the turnover and profit of the combined networking operations exponentially if given free reign.

It never happened, and the overall business spiralled downwards.

Within a year I had left the company along with many others of Logitek's once loyal employees. And shortly afterwards Logitek's share price plummeted as the City investors did not buy Jim Pickup's business annual report nor future plans.

Luckily, I sold some of my shares as I left and built an extension on my house. However, along with many other investors I lost a consid-

erable amount of value in my shares as they plummeted on the stock market.

Logitek stumbled along for a while before being bought by the Microvitec Group, a monitor manufacturer in Bradford. This was not however before Dave Randall bought back out Azlan from the group, taking with him a large chunk of the networking division Logitek had built.

The lesson from this is; do not underestimate the loyalty, experience and skill of those who help you build a business.

Second lesson: Don't place your trust in newcomers over your existing staff.

Anyway, we now come into the second phase of the Logitek history, under completely new management.

I rejoined Logitek in 1992 after a discussion with then Sales Director Brian Haynes, the only old Logitek employee who had stayed.

Brian explained his frustration with the new board. Apparently, they knew so little about distribution that he had stopped giving them detailed reports at board meetings.

I found out quickly what Brian meant when I met the chairman of Microvitec, James Bailey, for the first time. There was no welcome to the company or wanting to know who I was or how I thought I could help them. All James wanted to know was how I was going to shift 50 NCD X Terminals that had been sitting in the stores for the 2 years I had been away.

He stormed out of my office as he didn't like my reply. I was to experience many more of his tantrums over the next few years, till I walked out in the middle of a board meeting and never went back.

Anyway, within a month of my arrival Brian Haynes got sacked and was replaced by Tim Golding. Remember I had recruited them both into Logitek on the same day 10 years earlier.

Tim's first action on arriving was to sit in my office and ask my opinion on how we could turn around the business which had shrunk to just £800k turnover per month.

After explaining all the issues I had found since arriving, we set out a plan where Tim would focus on rebuilding the sales operation and I would focus on both training the sales force on the product range we now had and identifying any major accounts and business opportunities. Making sure we won those bigger deals.

Within 6 months we had the monthly turnover up to £2.4m and were flying.

Then suddenly, Microvitec sold off Logitek to 3 of their Board members, led by Robert Adams.

They had used the now significant creditor list to gain funding as they were unable to find independent sources, and I later found out they had used a document I had produced, in a bid for distribution of the new DEC Alpha products, to show they had a great understanding of the market.

In fact, I later learned that they wanted me to be part of the deal but that was blocked by James Bailey, who wanted me to run LTSS, Logitek's maintenance service division, which under Robert Adams stewardship had shrunk from £8m to £4m annual turnover and was now losing £35k per month.

Logitek then struggled on throughout the 1990s, and I next got involved with them when I left Westcon in 2000.

On leaving Westcon to set up my own consultancy, the first call I got was from Logitek who wanted me to come in and advise them on their future direction.

By this time Logitek had a poor reputation in the IT channel, though still a distributor they had a direct arm of the company com-

peting under another name selling direct into the corporate and educational market.

What was also concerning was that they were under investigation by their largest supplier, still 3Com, for abusing their educational discount scheme.

Under this scheme that was managed by Westcon on behalf of 3Com, educational resellers could get a product price lower than distributor cost to help them win competitive deals.

Resellers would then submit their orders and invoices for their educational deals to Westcon who would then re-imburse the reseller.

It appeared however that Logitek's was under investigation for using its subsidiary to fake educational orders and then moving the stock into the distribution side of their warehouse to enable them to undercut other 3Com distributors in the market.

I knew the 3Com investigation was ongoing and advised in my report that fundamental to their survival and success was to keep the 3Com franchise while building a broader business proposition.

However, about 9 months later I got a call from them to say they were folding up their business. They did explain that the plan I gave them was starting to work, but other events overtook them, and they were basically running out of cash and 3Com were suing them for fraud.

The fall was complete.

The 1990s

Rapid Expansion

Introduction

Following the transformation of technology, architectures and business models in the IT industry of the 1980s, the 1990s was all about exploiting the opportunity.

Overall, the decade was a period of incredible advances in the price performance of hardware and a decade of phenomenal growth for both PCs and servers.

In terms of PCs unit sales went from 40 million units a year in 1990 to 140 million a year in 2000. IBM, Dell and HP were all notable winners with Dell's sales over the period rising from $2 billion a year to $30 billion a year.

The market for servers also grew from about $6 billion a year in 1990 to $20 billion in 2000.

This phenomenal growth accelerated throughout the 1990s as the speed of local area networking started to match the performance improvements of PCs and Servers, the cost and speed of wide area com-

munications, eventually met the demands of the corporate world, and connectivity became available to everyone wherever you were located.

Throughout the 1990s, as these issues were addressed, we saw the emergence of large-scale datacenters, the Internet, and IP Telephony.

The Network becomes the backbone

As organisations' local area networks grew in the late 1980s, they started to see significant performance degradation due to the shared nature of Ethernet architecture using hubs.

It was like everyone had powerful and expensive motors but there were no motorways or A roads to take them on.

In 1990, however, a company called Kalpana developed the EtherSwitch which revolutionised Local Area Networks (LANs) by allowing multiple devices to transmit simultaneously, providing dedicated bandwidth per port on the switch.

The traditional shared co-ax cable was defunct and replaced with twisted pair cabling from switch direct to the device.

The Ethernet switch totally changed the landscape of corporate computing, allowing real client – server applications to run across the organisation.

Sun's prediction that 'the Network is the Computer', was suddenly a reality.

The Ethernet switch explosion created some of the largest IT companies in the industry. Cisco, who bought Kalpana and Crescendo in the early 1990s, emerged as the number one player in the market and would go on to dominate the network market over the next decades.

Also emerging at this time alongside Cisco and 3Com were Cabletron, Synoptics and Nortel.

One of the real drivers for Cisco's success in this period was their channel strategy. Very early on they realised that to get real market penetration they needed to use the new Systems Integrators who worked closely with their clients understanding their whole IT architecture.

Cisco set up proper training and accreditation schemes for their channel partners and rewarded them for their accreditation levels, not just sales numbers.

This channel model was not universally followed by their competitors, particularly not by Cabletron.

By this period in the early 1990s I was running an early Managed Services Provider, looking after Unix servers on behalf of channel partners and providing networking installation and support services for those partners and direct to one or two large organisations.

We worked at the time with both 3Com and Cabletron to provide networks for our clients and thought we had a good relationship with both. However, when putting together a quote for one of our channel partners for a relatively small network, around £15k worth of networking hardware, we proposed a Cabletron switch and submitted the design to Cabletron for validation.

Cabletron then went direct to the customer and undercut our partner.

We got our revenge shortly after when we were asked by a large utilities company, whose current Cabletron networks we maintained, to design a network for their new headquarters.

After the issue with Cabletron, we designed the new network around Synoptics products and then supported the channel partner who bid for the contract.

Our partner got a £1m deal, we got the design contract, and the support contract and Cabletron lost one of its biggest clients.

As Cisco, Synoptics and Nortel grew rapidly using the channel, Cabletron slowly declined.

(I will come on to show how the channel became increasingly important in this decade later on.)

The next major change in the networking arena happened in the early to mid 1990s with the incorporation of the router into the Ethernet switch.

Routers had been developed for Arpanet in the 1970s and throughout the 1980s were enhanced to enable complex network routing across organisations.

Early routers operated at layer 3 of the transport protocols and supported multiple protocols using software-based processing. This was ideal for corporate networks where there were many proprietary mainframes and minicomputer systems.

In the mid 1990s, we saw the emergence of level 3 switches to alleviate the need for routers in the LAN. The routing within the switch was provided by ASICs (Application-Specific Integrated Circuits).

To compete against Cisco, who were leading the market in Level 3 switches, in 1994 Synoptics merged with router specialist Wellfleet to form Bay networks, who themselves were bought by Nortel in 1998.

At a corporate level these two major network vendors were joined by Lucent Technologies, a spin off from AT&T, in the late 1990s as the network market matured.

At the SME level 3Com still dominated alongside Linksys, Netgear and Xircom. Eventually, however, 3Com merged in 1997 with US Robotics to address the SME market more broadly and then effectively dropped out of the corporate market by ending their Corebuilder Ethernet switch product range.

Throughout the late 1990s the network topology changed very little except got much faster, incorporating fibre. However, at a deeper

level within the switch, much more intelligence was incorporated to allow for VPNs (Virtual Private Networks), security firewalling and specialised storage area networking.

I think we are all used to VPNs now when connecting our laptops from a remote site into the corporate network, but back in the networks of the 1990s VPNs were used within the Ethernet switches to guarantee bandwidth for certain critical applications.

Prior to VPNs, someone transferring a large file across the network could kill the response time for users linking to a live interactive application. By using VPNs and the router technology in layer 3 switches, organisations could now create rules giving priority to traffic for a critical application and its users and in effect create a virtual private network for those applications or for specific users.

This came particularly important at the end of the 1990s as IP telephony voice and video calls started to run over the network.

At a security level too, the new switches started to incorporate firewall technology to segment part of the network to only authorised personnel or applications.

Till the late 1990s Firewalls were primarily used in front of the corporate network to keep out unwanted intruders from the internet. Now they took on a more guardianship role within the network environment itself.

The story of the third area of networking growth, Storage Area Networking, I would like to park for the moment and revisit it when I come on to the emergence of the data center.

First, however, I would like to focus on the evolution of operating systems both at desktop and server levels.

Windows and Unix come of Age

Windows

I can with confidence say that those of us using a desktop or portable computer at the beginning of the 1990s loved and hated Microsoft's Windows operating system in equal measure.

In the late 80s we saw Windows 1.0 which gave us a mouse driven GUI and 2.0 which added overlapping windows, then in 1990 came 3.0 with icons and better performance.

At last, we had an OS for the desktop PC that was easy to use like the Apple Mac. Though it took till Windows 95 to revolutionise PCs with a Start menu, taskbar and 32-bit support. Then, with the launch of Windows 98 we got better integration with the Internet.

However, alongside the Windows 9x versions, in 1993 Microsoft launched a new operating system, Windows NT (New Technology).

Windows NT was a full 32 bit operating system designed both for power users and in file servers. NT had a new file system, NTFS, to replace the old FAT (File Allocation Table) that came from the old MSDOS world.

Windows NT though still just a multi-tasking OS, it rapidly replaced Novell and other proprietary server OSs in the LAN server market.

Despite this, it could not challenge Unix when it came to real multi-user applications.

That is until Citrix came along.

Citrix had been working alongside IBM and Microsoft on providing remote access, thin client services to multiuser OS 2 users. When Microsoft split with IBM on OS2 Citrix then developed Winview for Microsoft.

This evolved with the launch of Windows NT into Citrix WinFrame a groundbreaking technology that turned Windows NT into a multiuser operating system.

I first got involved with Citrix in early 1994 when I joined a small start-up distributor called Volante Distribution, founded by Richard Jackson and David Tsang. More on Volante in my section on wide area communications and the Internet and in my outtakes where I explain how it evolved into Westcon, a $3.8Bn distributor within 5 years.

To get back to the story on Citrix.

I sat in my office at Volante one morning going through the mail when I spotted a new release brochure from one of our suppliers, Attachmate. The release was about a new product of theirs called Terminal Server, which was basically an OEM'd version of Citrix WinFrame.

I still remember getting up from my desk, still reading the brochure, and walking through to David Tsang's office where he was reading the same brochure with a big grin on his face.

I looked at him and said, "Is this what I think it is?"

"Yep" he said. "It turns NT into a multiuser operating system."

We agreed this was a momentous opportunity for us if we could get a deal direct with Citrix to distribute in the UK.

At this time, we were growing rapidly supplying router and terminal access products not only to the IT channel but also to the emerging ISPs (Internet Service Providers). We were also in the process of being refinanced and eventually bought by Datatec in South Africa and acquiring one of our competitors Data Guardian.

Despite all this going on, Richard Jackson and I pursued Citrix for a distribution deal. We even had a meeting with them at our proposed new office in Winnersh, which was still occupied by US Robotics.

Eventually we were called down to Citrix's office to hear about our fate.

Driving back to our office later, Richard and I couldn't wait to call David and give him the good news.

"We got it." we yelled down the Phone.

Only to get David's response, "Microsoft just announced they won't license Citrix on their new release of Windows NT."

We thought he was joking at first, then the reality hit in.

It took 3 months of hard negotiations to get a deal between Citrix and Microsoft where Microsoft would embed the core of Citrix in their new Windows NT4 – Terminal Server.

This still left Citrix with all their management software and thin client software which enabled real applications to be deployed.

Once we got the go ahead that everything was settled, we set up a series of roadshows with our channel partners to explain the business opportunity, and then with them to their clients to show how they could deploy solutions across their organisations.

Overall, we did about 150 roadshows over an 18-month period.

The response we got at these roadshows was amazing and you could often see in the middle of the presentation when members of the audience suddenly got what it could do for their organisation.

It wasn't just the fact that Windows NT became multi-user; it was the fact that they no longer needed to have the applications running on the desktop PC.

In the corporate world it meant that they no longer needed a PC on the desktop, and they no longer had to update every PC every time Microsoft did a software upgrade to Windows.

It also meant that they did not need to regularly replace desktop PCs. If they could run the thin client software, the user could access all their applications, all running on central NT servers.

At this time there was a plethora of new thin client devices suddenly appearing to satisfy the corporate market. Why have an operating system on the desktop when you only need a screen, keyboard, and mouse.

At a company level, when software upgrades of applications were needed, they only needed to update the NT server, and all users had the latest software on their device.

Though there was great excitement around Citrix, it did take considerable time from the first demonstration to a roll out phase across a corporate environment.

In the early days, we sold through our channel partners lots of 10, 20 and 50 seat evaluation copies, but it took up to a year sometimes for the 100, 500 and 1000+ seat orders to materialise.

According to the IT directors I spoke to, it totally changed the way they deployed applications across their organisation. They had to rethink what devices they had on desktops; they had to upgrade networks to support the type of traffic that thin client devices generated, and they had to create datacenters where there had once been server farms.

It was this last restructuring and creation of datacenters that I will come onto in my next section shortly.

Before that I would like to focus on the evolution of Unix.

Unix

I left the Unix story at the end of the 1980s where there were about 38 different commercial versions, and software developers were struggling to support their applications on so many variants.

This had started to change at the beginning of the 1990s because most of the major vendors had agreed to follow the POSIX (Portable

Operating System Interface) standards set out in 1988 by the IEEE computer society.

POSIX compliance guarantees that applications developed on one platform can be easily ported to another, allowing developers to rely on a standard and predictable environment.

Conforming to POSIX standards was UNIX System V (SVR4) released in 1989, which became the dominant commercial standard by 1990–1991, merging AT&T, BSD, SunOS, and Xenix features. This move was vital for the growth of Unix based applications in the early 1990s.

However, alongside this there appeared a totally new operating system, Linux, first released by Linus Torvalds in 1991.

Linux was written from scratch as an open-source, Unix like operating system conforming to the POSIX standard. The open and free nature of Linux opened its opportunities greatly, and there quickly emerged several packaged 'Distribution' versions such as Ubuntu, Fedora and Red Hat.

The fact that Linux was developed by a global community and not controlled by specific vendors and ran on nearly anything from embedded devices to mainframes led to its rapid adoption during the 1990s. It is even the underlying code of Android.

The conforming of Unix variants to the POSIX standard, the emergence of Linux, and the development of Windows, using Citrix, into a multi-user operating system opened a whole new world of corporate computing.

Organisations were no longer tied to specific vendors for their solutions. They could pick and choose the best applications, on their preferred architecture and deploy it however best suited their organisation.

Computer room to server farm to datacenter

In the 1960s, 70s and 80s, Mainframes and minicomputers were mostly housed in secure, climate controlled, glass walled computer rooms.

This reflected their status as much as their need for environmental control.

With the evolution of the PC and client server computing, we also saw the emergence of server farms, often housed in similar environments but in some organisations confined to cupboards. Reflecting their status in computer hierarchy.

I remember in the late 1980s being called into the Stock Exchange to explain why their 3Com file servers were so unreliable. On visiting the site, we had trouble locating the servers.

They were not in the computer room with their IBM mainframe or DEC minicomputers. We eventually located them in a small, very hot closet nearby. There were 6 file servers stacked on top of each other, all on an office chair.

The servers were all covered in brick dust as someone had recently created a cabling duct through the wall directly above the servers.

The IT director at the Stock Exchange was extremely embarrassed when being shown the state of the servers and after cleaning up they were relocated into the computer room.

The acceptance of PC file servers as real 'computing devices' accelerated in the 1990s as more and more critical corporate data was held on them. The advent of client server computing and network computing also blurred the edges between office automation and computer data processing.

By the mid 1990s the term Data Centre was starting to be used to define where all the centralised computing and data storage was

held. With the advent of the Internet and web servers, the Data Center became the epicenter of not only corporate computing but also of the World Wide Web.

This expanding role of the data centre necessitated a rethink of its architecture to accommodate the variety of facilities it had to support.

In the early 90s it had to accommodate all different sizes and shapes of minicomputer systems as well as floor standing PC Servers and 19" racks full of networking and communications equipment.

Throughout the 1990s the datacenter evolved and all compute, storage, networking and communicatons devices started to conform to the 19" rack mounted format we all see today.

To get to that position, however, was quite a struggle.

First and foremost was the need to not only maintain but rapidly increase the compute power of the servers within the datacenter. As companies started to deploy more complex and diverse applications to users across their organisations, the physical constraints of the architecture of the server became apparent.

There were 2 main constraints, firstly as CPUs got faster the need to dissipate the heat generated became paramount, and secondly the need to have local storage to the CPU really restricted the ability to deploy high performance applications.

Taking the first issue, while server manufacturers created clever heat sinks to dissipate the heat from the microprocessors more efficiently, data centers had to provide forced air conditioning and implement hot/cold aisles where the front of servers faced each other in the racks, the cool

aisle, and thus the fans faced each other creating the hot aisle. By doing that they could focus their air conditioning to greatest effect.

However, the negative side to heat sinks was that their size meant that in a typical 19" rack you could only physically use a third of the available slots. This issue was not really resolved until the early 2000s with the advent of multi-core processors.

Data Storage

Now, coming to the issue of hard disk deployment, in the early 1990s most organisations were starting to explore the use of Network Attached Storage (NAS) devices that provided centralized file-level storage.

Auspex Systems was one of the first to develop dedicated file servers that supported Unix-based systems primarily through the NFS (Network File System) protocol.

Windows itself easily connected to NAS devices using SMB/CIFS protocols, allowing them to appear as local drives in File Explorer for backups, media streaming, and shared storage.

However, it was the emergence of NAS devices from NetApp, which supported both Unix and Windows, that really accelerated the market. NetApp was quickly joined by a host of new providers, the most prominent of which was EMC.

The emergence of NAS devices spawned a whole new range of storage services that the IT channel could offer to their clients. The most important of these was data backup.

Up until the early 1990s, most backups of client data were done to magnetic tape. Talk to any IT manager or accountant from that time and they will describe both the time spent waiting for the daily or weekly backup to complete and the horror stories when the backups

failed to work correctly and then having to recover after a system failure with out-of-date data.

As the 1990s progressed, these backup services expanded from simple tape replacement to automated, scheduled backups and the ability to backup files when they were in use.

Then, towards the end of the 1990s, remote and online backup services started to emerge as early Internet Service Providers (ISPs) looked for more uses for their data centres.

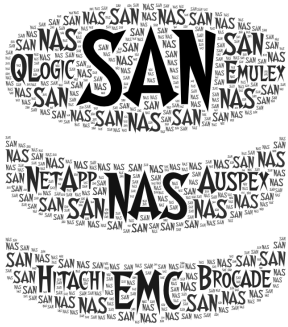
By this time, I was Business Development Director at Westcon and we were the first distributor to offer these remote backup services through our channel of Systems Integrators. We partnered up with a local ISP and put together a flexible range of solutions that enabled our partners to dominate this emerging market.

By the mid to late 1990s NAS devices proliferated in all types of organisations from SME to major corporates and still to this day they are a fundamental part of any IT infrastructure.

However, as critical applications started to move from minicomputer and mainframes to distributed Unix based systems, their performance was starting to be limited by existing storage architectures. Thus, emerged Storage Area Networking (SANs).

SANs decoupled storage from servers to allow a more scalable environment for these critical applications and at the same time providing more centralised management and control.

The first difference between a NAS and a SAN is that a NAS presents storage as a file system over a standard network whereas a SAN presents storage as raw data blocks over a Fibre Channel or iSCSI network.



As far as the Unix or Windows server sees the data; it appears as a network drive on a NAS server but as a local hard drive in a SAN environment.

Fibre Channel networks supporting SANs operate at speeds from 1 to 128 Gbps, ensuring reliable, low-latency delivery of block-level data, most commonly over optical fiber as its name suggests.

iSCSI is a networking standard that transports SCSI commands over TCP/IP networks, allowing servers to access remote storage devices as if they were locally attached. It enables cost-effective, block-level storage networking (SANs) using existing Ethernet infrastructure without specialised fibre hardware.

ISCSI was pioneered by IBM and Cisco as a cost-effective, IP-based alternative to expensive Fibre Channel SANs.

Despite many players in the NAS and SAN markets EMC strode ahead of all and by the end of the 1990s, after acquiring its biggest competitor, Data General, was valued as the second-best performing stock on the S&P 500, having risen 155,855% from the beginning of 1990.

By the end of the 1990s, the datacenter had become the epicentre of computing for companies from SME to major corporates and for the emerging ISPs who would go on in the 2000s to replace many in-house data centers.

ISPs – from information delivery to remote datacenter.

The evolution of ISPs (Internet Service Providers) started following the creation of the World Wide Web by Tim Berners-Lee who developed the first web server, the first web browser, and a document formatting protocol, called Hypertext Markup Language (HTML).

With the launch of Mosaic developed by Marc Andreessen's (later Netscape Navigator) as an easy to use and install web browser, the Internet boom had started.

The websites for use by the general public began to emerge around 1993–94.

This spurred competition in server and browser software, highlighted by the Browser wars which was initially dominated by Netscape Navigator and Internet Explorer.

This also drove competition amongst the fledgling Internet Service Providers as they jostled to gain market share.

Primary among these in the UK was Pipex, who initially focused on business customers and was pivotal in establishing the London Internet Exchange in 1994 after installing one of the first transatlantic 64K leased lines.

Pipex was rapidly followed by Demon Internet, ExNet, Pavillion, Easynet and Zen Internet.

I am not going to cover in detail the rise of the Internet as it is well documented already, but I will describe how these ISPs evolved to be more than just a route into the Internet.

In late 1994, soon after I joined Volante, Richard Jackson and David Tsang identified a role for one of our products that they felt would catapult us forward as a business.

We were already providing modems to the early ISPs so they could provide dial in access for companies and individuals, but what they spotted was that the ISP had then to insert a dial access router to take the traffic from the modems to their internal network and then on to

the Internet. Most of these dial access routers only supported up to 8 modems.

What we had in our portfolio was the Telebit Netblazer, originally developed as a gateway to connect remote users or small branch offices to the internet or corporate networks, but could support up to 40 modems.

Not only could it support more dial access modems in the one device, but it also had great management software enabling ISPs to provide a variety of service levels to different clients.

I remember going with Richard to meet with one of the fastest growing ISPs in London. The door to their premises was next to a grocer's shop and the single door led down to a cellar which turned out to be their datacenter.

US Robotics Sportster modems were velcroed all along the wall all buzzing away taking dial in calls from their customers.

I discovered this kind of environment was not unusual as gaining funding for these startup ISPs was difficult. This meant we had to carefully manage these accounts as it was inevitable that some would go under.

Luckily for us, the market just took off, and we supplied most of these early ISPs. We also got a further boost when we got distribution rights for US Robotics' Total Control system which had the same function as the Netblazer but included the modems within the chassis.

A later model using Hyper DSP cards could handle up to 336 simultaneous 56K modem connections.

Apparently, there were 392 ISPs in the UK in the mid to late 1990s, most of whom either merged or were bought over the following decade.

Those who survived used the massive growth of the Internet to diversify their operations to appeal to corporates as well as individuals.

The connections they all had to build with the major back-end communications suppliers enabled them to enter the rapidly growing wide area network market offering not just connection services but server hosting and data backup services.

By the late 1990s, ISPs had started to become a critical IT service provider to the industry working alongside the channel to provide remote datacenter facilities to companies of all sizes.

These additional services protected many ISPs over the following decade as internet access just became a commodity as the large telecommunications providers moved into the market.

Speaking of which!

Connectivity becomes king – eventually

You may remember that I commented that many IT projects in the 1980s got cancelled because the annual cost of wide area networks was often more than all the hardware and software combined.

That situation did not alter overnight, but the pressure for change certainly increased as we went through the 1990s.

There were several reasons why it took so long for communications companies to catch up with the demand from the market, but the primary reasons were lack of agreement on international standards and the dominance of the market by national PTT (Post, Telegraph, and Telephone) companies.

These PTTs were government owned and though deregulation was happening across the world from the mid 1980s, there was still an invested interest in keeping the PTTs in primary position in the market.

In the UK, the Office of Telecommunications (Oftel) (the telecommunications regulator) was a department in the UK government,

under civil service control, charged with promoting competition and maintaining the interests of consumers in the UK telecommunications market.

However, all the emerging telecoms providers accused it of being captured by BT and giving the dominant operator too much freedom to leverage its monopoly status.

This argument raged till Oftel was replaced in 2003 by Ofcom. Unfortunately, Ofcom was also accused of the same till it eventually forced BT to separate its last mile business into Openreach in 2006 and then legally separate in 2017.

Before I explain how the industry got around the communications dilemma of the 1990s, I would like to go a bit technical and explain some of the evolution in technology that challenged the industry.

Up until the 1990s all wide area communications relied on X.25 and TDM (Time Division Multiplexing) technologies. X.25 is a protocol for packet-switched networking, while TDM is a method for transmitting multiple data streams over a single channel by dividing time slots.

Operators often used these technologies together to provide the services they offered to clients.

The issue with both these technologies was that they were slow, inefficient, and too rigid to support the digital requirements of the 1990s.

So, in the mid 1990s they were slowly phased out and replaced by Frame Relay and ATM.

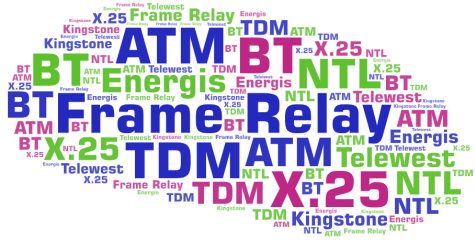
Frame Relay is a high-performance, packet-switching WAN technology operating at the OSI physical and data link layers (Layer 2) to connect LANs and transmit data efficiently. It was specifically designed for data circuits rather than time critical and latency-dependent applications like voice and video.

Frame Relay offered UK and international businesses a more efficient and cost-effective alternative to X.25 and dedicated leased lines for WAN connectivity.

ATM is a cell switching technology, using fixed length cells and is primarily used in the core and backbone of telecommunications networks. It is designed to handle voice, data, and video.

This move to Frame Relay and ATM in the mid 1990s really kick started the communications environment we are used to today.

When I say 'kick started' I don't mean it suddenly took off. In reality, it was a tortuous period as BT had little incentive to accelerate the roll out of their Frame Relay and ATM networks.



It firstly took a critical government review that ended the duopoly it established in the mid 1980s between BT and Mercury and then some real competition not only from the likes of Cable and Wireless, who had bought Mercury Communications, but the emergence of new carriers like Energis, NTL, Telewest, Kingstone Communications and British Rail Telecommunications.

These new players really started to hurt BT in their most lucrative markets by utilising alternative backbone technologies. Energis utilised the National Grid electricity pylons for its network infra-

structure, Telewest and NTL utilised their cable television networks and British Rail built their backbone across their rail network.

As corporations and ISPs started to build their Datacenters around the UK, a key critical decision-maker on location was the availability of these alternative telecom infrastructures.

This was not only for the best prices but also for redundancy and reliability. If your business was reliant on one telecoms provider, you would be in real trouble if their service went down.

Most ISPs had at least two telecoms providers ensuring that each came from a different location into the premises. Early entrants into the market had been caught out losing their connection because roads had been dug up, or local floods had got into cabling ducts.

One ISP I worked closely with in this period had experienced losing one of their two connections when the road outside their building was dug up for sewage repairs. This prompted them to add a third connection. Luckily their building was located alongside the main train line from Reading into London. Thus, they were able to take a feed from British Rail Telecommunications.

As these new entrants rolled out their networks across the UK many organisations were able to take advantage of real alternatives to BT. However, for the majority of UK companies BT was still their only alternative.

BT still had the largest network, and they also controlled most of the 'last mile' to customer premises. They also provided all the back-end voice infrastructure which all companies relied upon.

Up until the end of the 1990s, the IT channel was also reliant on BT when they were supplying dial up or wide area connectivity to their customers but were often waiting weeks or months to get connected.

At this time, I was Business Development Director at Westcon, by then the UKs largest distributor focused on networking and communications technology.

In my role, I felt it imperative to help our channel partners get a better service from BT. The bonus being it would also help us sell more modems and routers.

I approached BT, who already had a channel program for telephony resellers to sell BT's voice lines, with a view to selling data connectivity with every modem and router we supplied through our channel partners.

We quickly put together a program where Westcon and its partners would each get a percentage of all line rentals sold and then a percentage of renewals each year.

Once our channel partners realised they could now earn money for selling connectivity services and then receive annual recurring revenue from renewals, they signed up in their hundreds.

We had to set up a new sales and support team just to handle the level of business generated. We also focused on smoothing the process with BT and reducing lead times.

BT saw a tremendous increase in sales of all their business lines as we educated the channel on how to specify wide area network solutions for their clients.

It was a 'win-win' situation for all.

Once other distributors saw how well we were doing with BT they all signed up similar deals.

In response Cable & Wireless and the other telecoms companies suddenly got interested in the channel.

Despite the competition, Westcon sold as many lines as all the other distributors combined.

The communications explosion had at last started. Though we had to wait for the release of broadband in 2000 to see it go stratospheric.

Tremor in the telephony world.

Since deregulation in the late 1980s, the on-premise PBX market flourished in the UK, utilising digital switching technology over analogue or ISDN connections to BT exchanges.

This huge market grew in parallel to the IT industry providing telephony services to companies from SME to major enterprises.

As BTs' dominance waned throughout the 1990s, we saw some of the world's largest companies take a significant share of the PBX market. The likes of Nortel, Lucent, Siemens, NEC, Mitel, Alcatel, Fujitsu, Hitachi and Samsung all vied for this huge market.

However, in the late 1990s a new phenomenon appeared, IP-Telephony, which over the following decade was to totally disrupt the PBX market and bring telephony within the scope of the IT manufacturers and channel. Launching the new term for the industry, ICT (Information and Communications Technology).

IP-Telephony, as one would expect, started small with new innovators creating the functionality of the PBX in software running on a server platform.

The server platform then had add-on cards, to connect traditional telephones and to provide serial or ISDN connectivity to the telephone network.

The real disrupter in IP-Telephony however was the ability to use a PC, Laptop or an IP phone to connect to the PBX over the company's computer network. Also, if the computer network linked to an organisation's branch offices, then there was no need to have a PBX at each site.

I was extremely lucky to get involved with IP Telephony very early on in its evolution by identifying the first viable IP Telephony system in the UK, from a start-up company called Network Alchemy.

Network Alchemy

I spent several months evaluating not just the product, but whether the market was ready and more importantly whether the traditional IT Systems Integrators were interested.

As an IT distributor, we had to ensure we had the skills and knowledge to support the channel through their learning curve, and we had to have all the ancillary products and services to put a complete offering together for the end user.

It took lots of roadshows to explain to the channel the opportunity and how we could hold their hand during their initial forays into the market.

Slowly but surely, we built a fledgling channel and achieved great sales in the SME market, which was the hot spot for this new technology.

As Westcon formed, see the outtakes for this period; our success with Network Alchemy attracted interest from the likes of Nortel and 3Com.

Westcon was already a distributor for both networking companies, with Nortel already a major player in the voice market and 3Com about to launch their own IP Telephony products.

Additionally, Westcon had just been appointed the first worldwide distributor for Lucent, who was in the process of spinning off their voice arm, forming Avaya as the world's largest voice vendor.

Avaya went on to buy Network Alchemy, renaming their product IP Office, which became the most successful SME IP Telephony product in the UK for the next 5 years.

It was the SME market where IP Telephony really took hold. It was easy for SME businesses to understand the benefits of utilising their existing IT infrastructure for their voice calls and all manufacturers supplying this market were forced to offer their own version of IP Telephony alongside their traditional products.

The problem for most traditional vendors in the voice space, and their resellers, was that they had no IT networking knowledge. How could the end users trust them to put their voice over the network without causing major problems.

So, over the final days of the 1990s, a big battle raged over whether it would be the IT or voice resellers who would win in the IP Telephony world. The data channel just saw voice as another application they needed to get to grips with as the market evolved.

The voice channel could not afford to lose out as it was their whole business. Many invested by buying the expertise in personnel or in many cases merged with or bought IT channel companies.

I will come on to show how IP Telephony really took hold and became a major part of the IT world in my section on the 2000s.

Suffice it to say that this small tremor became an earthquake that completely changed the IT landscape.

Wifi is born

In 1997, the IEEE committee ratified the 802.11 standard for wireless networking with data rates of 2Mbps operating in the 2.4GHz frequency band.

This was the start of a revolution of connectivity for devices on to the corporate network and eventually the world of the Internet and the cloud.

At the point of ratification, the wireless world was dominated by 2 vendors, Aironet and Symbol Technologies.

Both had their own proprietary versions of wireless networking which they sold primarily into the retail and warehouse markets where the need for wireless networking overrode the importance of standards.

However, with the ratification of 802.11, both companies embraced this new standard, which would open a whole new market for them.

Around this point I had been looking for new technologies for Westcon and came upon Aironet, which Datatec, Westcon's parent company in South Africa, already had distribution rights.

Using Datatec's links, I quickly got distribution rights in the UK and put together a small team to take it to market.

Two of that team came from South Africa as they had years of experience deploying wireless networks both on premise and over wide area.

Wireless at that time was very important in building South Africa's IT infrastructure as laying copper underground or overhead never

lasted long. Copper was too valuable and was regularly ripped out by thieves.

We therefore benefited from their years of experience.

However, it all started very slow as their expertise had to be passed on to our channel partners, and then they and us had to stimulate the market by showing what wireless networking could deliver.

There was also another issue around interoperability between different companies' versions of the 802.11 wireless standard that was slowing down adoption.

End users wanted guarantees that if they bought one manufacturer's product, it did not lock them to that one vendor.

So formed, in 1999, the Wireless Ethernet Compatibility Alliance (now the WIFI Alliance) to certify product interoperability. The term 'WiFi' was thus coined, and the market took off.

Cisco bought Aironet, Lucent entered the market with WaveLAN and Apple launched the iBook laptop with AirPort. All the traditional Ethernet vendors also launched their own products.

Putting the network into the air opened a whole new world for end users and a whole new set of issues around security which I will come in the 2000s part of the story.

Application software grows up

Throughout the 1990s, application software started to take advantage of the changes to the underlying architecture of IT systems and networks.

Increased processing power, enhanced datacenter structures, and faster networks enabled software developers to deploy applications right across an organisation.

No longer were software applications limited to the accounts department, creative individuals or office users. Software companies were now delivering productivity solutions right across an organisation from the factory floor and the warehouse to designers and senior executives.

If anything, the 1990s was about delivering IT solutions that supported the whole organisation, not just accounts and office productivity.

Leading among these new applications and benefiting from all the new client server technology was MRP (Material Requirements Planning) software.

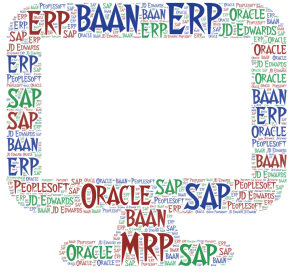
MRP was developed to manage manufacturing processes by ensuring the right materials are available for production, optimizing inventory levels, and streamlining scheduling.

The key features of MRP include bill of materials (BOM) management, work order generation, production planning, and inventory tracking.

As the 1990s progressed, these MRP systems morphed into ERP (Enterprise Resource Planning) systems to address all core enterprise functions.

So popular were these ERP systems that we saw the emergence of some of the largest software companies in the world.

Oracle, SAP, Baan, JD Edwards and Peoplesoft began to dominate this world of enterprise-wide computing software as corporations across the globe scrambled to use software to increase their profitability.



Even large corporations however struggled implementing these ERP systems as it meant bringing together all the information, practices and procedures developed over the years in siloed departmental applications.

For many companies, the benefits of moving to ERP systems were not seen for many years. In some fateful instances, the implementation was so complex and drawn out that companies collapsed before realisation of any benefits could be seen.

This was particularly acute in the mid-market where companies did not have enough resources to allocate to its implementation.

Whatever the difficulties, however, ERP systems came to dominate the corporate IT landscape by the end of the 1990s.

Channel Maturation

The 1990s saw a rapid growth in the IT market on the back of all the technology and software changes I have outlined in this section.

Distributors were the first to see the benefits of IT expansion across the whole of industry, and we saw the emergence and rapid growth of broad-line PC and component companies like Ingram Micro, Westcoast, Computer 2000, Frontline and Arrow.

Despite the appearance of these volume distributors there was still significant opportunities for specialist distributors growing off the back of the complex networking, datacenter and communications markets that emerged throughout the 1990s.

In the outtakes, to give you a real insight into the distribution world of the 1990s, I will describe how Westcon emerged from a tiny, Warrington based, start-up distributor Volante into one of the world's largest specialist networking distributors in just 4 years.

As distributors grew at an amazing rate so did companies supplying IT products direct to end users.

The likes of SCC, Computacenter and Morse Group were the early players supplying the corporate marketplace competing often directly against manufacturers like Compaq and Dell.

However, it was the emergence of Systems Integrators like Logica, Hoskyns Group, Sema Group, Cap Gemini Sogeti, Anderson Consulting (now Accenture), EDS and Admiral that really defined the role of the channel in this period.

These organisation really defined the future of IT companies by combining network and datacenter expertise with software application knowledge and then delivering it all wrapped around by consultancy and support services.

Each organisation came from a different starting point during the 1990s but by the end of the decade they were fully fledged IT services companies ready to dominate the new Millenium.

These large Systems Integrators were imitated right down the supply chain with traditional resellers, dealers and VARs adopting the SI model but adapting to match their markets, resources and expertise.

The 1990s saw a great deal of specialisation in the channel as these smaller SIs focused on specific knowledge and skillsets, such as networking, or on specific markets, like manufacturing, utilities, local government and the professions.

The 1990s saw the channel become the UK's real IT deliverers, and the major vendors of the 1980s become just technology brands. Though many tried to keep supplying direct to end users, by the end

of the 1990s most gave up and acknowledged that the channel was now king.

Summary

The rapid expansion in IT technology and services in the 1990s saw the emergence of some of the largest companies in the world. Suddenly IBM was joined by the likes of Microsoft, Cisco, Oracle, and EMC as not only significant in the IT industry but also replacing household industrial names on the Fortune 500 list.

The IT industry had come of age.

Everything was now set up for a storming 21st century. What could go wrong?

Well, the Y2K bug was a possibility if the doom makers were to be believed.

As we neared the end of the 1990s, there were concerns that some of the older hardware and software could freeze completely or become erratic because the year date 2000 had not been catered for when the software was written.

This was particularly an issue when a lot of old mission critical Cobol based applications were written for the banks and other institutions in the 1960s and 70s. At the time they were written computers were very tight on memory and therefore saving 2 characters of the year field was not uncommon.

The fear that computers would revert to 1900 when everyone else was in 2000 was real in many organisations.

Initially this fear really boosted sales of all hardware and software as companies wanted assurances that all their systems were Y2K bug free.

However, for the last few months of 1999 and early months of 2000 sales fell off a cliff as everyone waited for the world to end.

Happily nothing happened and we all got back to normal.

Outtakes

Apple

I have mentioned very little about Apple in the 1990s because basically they were in a mess until 1997 when Steve Jobs came back.

From a 10% market share of the desktop market in 1990, they were close to bankruptcy by 1996. Part of this was due to Windows PCs and thin client devices replacing them in the corporate and personal markets as well as Apple having the most confusing product range.

The launch of the iMAC in 1998 and the cancellation of most of their loss-making products started a revival that would see Apple become a major household name over the next 20 years.

Volante to Westcon

In 1994 I left the Microvitec Group where I had been running their MSP division LTSS and decided to run my own consultancy business.

My first phone call was to a local Systems Integrator, Comtex, owned and operated by two of my former colleagues at Logitek in the mid 1980s, Frank Wilkinson and Mark Ogley.

It appeared my call was very timely as they were in a dilemma as how to support a new venture, Volante Distribution.

They had set up Volante with Richard Jackson, another ex-colleague from Logitek, to distribute wide area network products to the UK IT channel.

The deal was arranged where Richard and David Tsang, Richard's business partner, would drive the sales of the business, and Comtex would provide back-end administration, financial, warehouse, and support services.

After a tremendous first six months of sales, Comtex was struggling to support Volante, particularly financially.

It seems my call was fortuitous, and Comtex engaged me for 3 months to assist Richard and David to bring some kind of order and control for future growth.

This we achieved quite quickly once we had focused on getting cash flowing by sorting out sales disputes and enforcing payment terms. Then we turned to looking at the business relationships with suppliers.

When starting the business Richard and David had used their relationships with several major modem and router manufacturers to gain distributions deals. They had then used their relationships with channel partners they had worked with at their former employer Data Guardian to build the business.

The major issue I identified quickly was the quality and reliability of the suppliers they had chosen. Some of the suppliers had too many distributors and margins were low.

So, we held a crucial meeting to do a SWAT analysis on these companies.

We did this from a position of strength based on the volume of sales Richard and David had generated in the first six months of Volante.

We evaluated all suppliers based on the quality and appropriateness of their products, the relationship, contract terms, and margins with that supplier and most importantly how they fitted with where Volante wanted to go.

It was a tremendous meeting resulting in Volante choosing its key suppliers to move forward with and dropping several suppliers who though providing a large percentage of early sales did not meet our new criteria.

The main supplier beneficiary of this meeting was Telebit, whose NetBlazer product was chosen as the leader in its market segment and the company itself as the most trustworthy to deal with.

My review of the 1990s explained how Volante achieved great things with the NetBlazer in the emerging ISP market, most of that down to Richard working very closely with Telebit to identify new business opportunities.

In fact, we became such experts on the product that David Tsang rewrote some of the NetBlazer's code to fix a serious bug and then Telebit included it in their next firmware update.

Anyway, having brought the business under control, Comtex realised that they didn't have the resources to grow Volante to reach its potential, so we agreed that, while Richard and David continued to grow the business, I would try and get alternative financial backing.

After lots of calls and meetings with potential investors we were getting nowhere when David said that he knew of a person who might be interested, Jens Montanana, CEO of Datatec in South Africa. David had worked for Jens when he was CEO of US Robotics in the UK.

As Datatec were also a Telebit distributor in South Africa, Richard rang Telebit to see if they could give us contact details for Jens. It happened that Jens was at Telebit's office in Newbury when Richard rang, and we quickly arranged a meeting that day.

Richard and I got in a car and drove straight down from Warrington to the motorway services at Newbury and had our first meeting with Jens.

Richard then met with Jens over the next couple of months to answer multiple questions he had as to our future direction and the teams experience to deliver on our plans.

3 months later Jens invested £100,000 of his own money in Volante, and we bought ourselves out of Comtex, setting up our own offices in Warrington.

Jens also got us distribution rights with US Robotics for their Total Control system, which accelerated the growth of the company.

It was 15 months later that Jens next contacted us, ostensibly to see how his investment was going, but also to find out why we owed US Robotics over £1.5m and hadn't paid them for 6 months.

I explained to Jens that business was going so well that we needed to use the extended credit from US Robotics to fund the growth of the business.

He asked why I hadn't come to him for additional funding and after my reply that he would want more of the company, he burst out laughing.

Anyway, we agreed to regularise the account with US Robotics and after discussions with Richard and David agreed it was time that Volante was bought by Datatec, forming Datatec UK.

Having seen the potential in the UK Jens asked if we could suggest other distributors worth buying to enlarge Datatec UK faster than growing just organically.

Richard thus supplied Jens with a list of around 6 other distributors who would meet the criteria.

Of these, the one that initially looked the most likely was Data Translation, who as well as distributing similar products to ourselves had two networking vendors who would give us a broader product set for our channel partners.

However, during due diligence, we realised that it was a bit of a mess and would require too much work to turn it around.

The second company that Jens approached was Data Guardian, the distributor that Richard and David worked for prior to setting up Volante.

Because of this relationship we had to bring over staff from Datatec South Africa to perform the due diligence.

Shortly after, a deal was done, and I was installed as the UK MD of the larger Datatec UK.

The merger of the two businesses was not as easy as we had imagined. Firstly, as part of the deal, one of the joint MDs of Data Guardian had an earn-out deal and thus I had to find a role for him for 6 months where he could positively influence the sales and help me integrate the two businesses.

Secondly, I soon understood why the business had stayed static for the previous few years. The product range was out of date with many of its vendors failing to keep up with technology changes; staff were micromanaged and never encouraged to use their initiative, and salespeople were too comfortable and not challenged to increase business year on year.

Though in turnover terms Data Guardian were 3 times the size of Volante their operations, processes and product range needed a real overhaul.

Obviously when merging two businesses, there are usually costs that can be reduced by not duplicating roles. As we did not have a large staff, there were little savings in staff costs though merging accounts meant that I had to make my daughter, who had been running Volante's accounts, redundant. A point she reminds me of, even to this day.

The biggest initial issue I faced in the merger was that Data Guardian staff had never been encouraged to think for themselves. When I asked all department heads and senior staff to each do a 10-minute presentation on their role, what issues they faced and what would they change to make their role and department more efficient, it freaked them out.

It wasn't that they didn't have great ideas, it was just that they had never been encouraged to think for themselves.

Slowly we turned this around and found some real gems in the organisation. However, having said to the meeting that my door was always open if they needed help, I remember looking up from my desk one day while writing a proposal and I could see 15 of them in a line outside my door waiting to see me.

Always when bringing together two companies the biggest issues are usually around senior staff and their new roles and this merger was no different.

With a 6-month earnout period for the ex-MD plus 6 month guaranteed sales earnings for the northern and southern sales managers, all agreed as part of the deal to buy Data Guardian, I was limited as to changes I could make to the management structure.

Also, in the first couple of months we established our new headquarters in Winnersh in the old US Robotics offices following their merger with 3Com and Richard, David and I moved down from Warrington with several of the Warrington staff.

We also realised that we had to maintain and increase both companies' sales to make the merger a success, so Richard focused on keeping the momentum on the existing Volante product range, particularly Citrix whilst I sorted out what we had inherited.

Richard was so successful with Citrix that they eventually poached him with the offer of the role of corporate sales manager and eventual-

ly Vice President of the UK and Ireland business before asking him to move to Silicon Valley in the USA to run the West Coast as the VP and General Manager of that region.. Luckily for us, this was not before he had recruited and trained a large, accredited Citrix channel base for us.

The next company that Jens went after to grow the DataTec UK business was Unity Distribution, part of the Logical Group (Later renamed Logicalis).

Logical however weren't interested in just selling Unity, they wanted to sell the whole group. This excited Jens and a deal was concluded. But there was a strict earnout clause which precluded our merger with Unity for 18 months.

That left me with a real dilemma because even though we were growing and we were fixing all the issues we inherited, we were struggling for cash. When we merged with Data Guardian, there was no extra influx of cash, nor did Data Guardian have a strong bank balance or debtors list.

We basically had to struggle until the merger with Unity happened.

Jens was unable to bring any money out of South Africa at the time due to their strict monetary laws.

It got to the point that when we got a £350k order for networking products and we were at our credit limit with the vendor, Jens said that he could arrange a loan in the UK.

So off Jens and I went to a beautiful building in North London where there were two 'ushers' at the door in very expensive suits. Jens and I signed the loan agreement for £350k with 2 interest rates, one for payment in 30 days and another for 60 days.

On the car journey back to our offices at Winnersh, Jens pointed out the importance of meeting the 30-day payment terms to make the deal worth doing.

I asked him what would happen if we went past the 60 days. Jens replied that he would be back in South Africa.

I met the 30-day deadline.

This juggling of cash continued for a further few months before Jens rang me to tell me he had secured a deal to bring £1m out from South Africa.

As the day approached, I sat down with my finance director Rob Evans (the only bit of Data Translation worth having) and identified which suppliers we would prioritise.

The money hit our bank account over the weekend, and I went to Rob's office first thing on Monday morning to action payments, to be told that Jens had taken half the money to buy another distributor RBR.

Long term, a great decision as RBR was a UK Cisco distributor and would be the base of Comstor UK less than a year later.

For me it was a great disappointment at the time and though it gave me some leeway with suppliers, it stalled lots of expansion plans we had.

Anyway, eventually the merger went through with Unity, but it was not great news for me or some of my team.

As Unity had a turnover 3 times that of Datatec UK, and distribution deals with some of the industry's top networking vendors, their MD Richard Chilver was to be the MD of the merged company.

I had anticipated this, but Richard was adamant that he did not want me in the business while he integrated the two companies.

I expected Jens to just accept this and offer me a deal to exit the company, however he had other ideas.

His observation of Unity in the months leading up to the merger was that they had a great operation, a distribution engine that capitalised on their vendor relationships. What they did not have, however,

was any skill at identifying new emerging technologies and picking potential winners. Neither did they have any expertise in taking these new technologies to market.

So, Jens proposed setting me up with a small team at our offices in Winnersh solely focused on finding and nurturing the next IT winners.

Over the following months we identified 6 new technologies and vendors that we felt would be pivotal, long term for the company's growth. The most successful of these were Network Alchemy in IP Telephony and Aironet in WIFI technology.

I have covered the growth of both technologies and companies earlier in my review of the 1990s.

So, for 6 months the small group I had with me went through a tremendous learning curve on identifying, marketing, and building a channel for these new technologies. It was great fun, with an open brief to be successful.

But this was only the start as after six months I got a call from Jens to arrange a meeting with Richard Chilver to discuss how I could bring what we had built into the mainstream Unity Distribution operation.

But it was more than that. During my 6 months sabbatical Jens had gone mad and bought Westcon and Comstor in America. Westcon was the top distributor for 3Com and Nortel in North America, and Comstor was the top distributor for Cisco.

As part of the deal Unity was to be renamed Westcon UK and RBR renamed Comstor UK.

Why Jens thought it urgent that I be brought into Westcon UK was driven by the fact that Westcon had just got a worldwide deal to be Lucent's sole distributor of their networking products.

Jens had persuaded Richard Chilver that I should join as Business Development Director and spearhead the introduction of Lucent into the UK channel.

Richard rather grudgingly accepted his fate, and I could understand his reticence. Here I was, put forward by Jens as the answer to all his prayers, the person who had a close relationship with many of his staff who had also upset many of his suppliers while juggling the cash flow situation at Datatec UK.

Anyway, after a clear the air meeting we got down to building Westcon UK, with all the new products brought by Lucent and my eager team from Winnersh.

We had a really exciting 2-year period where we built business relationships with our new vendors, introduced IP Telephony to the channel, and generally challenged our competitors to match our knowledge and expertise in these new areas.

I was not all smooth sailing, especially when 3Com killed of their Corebuilder networking range to focus on SME level products. This effectively took £20m out of our annual revenue and though we rapidly tried to fill that gap with networking products from Lucent and Extreme Networks It was the revenue and most importantly the profit margin from Citrix that saved the day.

My greatest pleasure from this period with Westcon was the way we developed the staff and the organisation.

We managed to build a tight distribution operation whilst developing a new technology market making engine.

We developed within the organisation a continual learning ethos and a solution selling methodology.

We provided after hours training for sales and operational staff, where our technical team and I would not just teach the features and

benefits of a product, but where it fitted into the overall IT solution for a client.

These courses were not mandatory but soon became a vital part of the success of the business. Salespeople were suddenly able to identify new business opportunities, admin, accounting and operational staff understood what the company actually did, and how their role tied in with a successful sale, and our technical guys were stretched to encompass and enjoy new technology.

We set a new standard in market making ICT distribution in the UK that many others tried to copy.

Jens was so inspired by what we were achieving that he encouraged me to meet with Westcon's CEO, Alan Marc Smith, next time we went across to the headquarters in New York to explain what we had achieved and how I felt we could roll out the model across the whole of Westcon.

Unfortunately, Alan Marc Smith just didn't want to know, and I could see by the mess in his office that he was already struggling to control what he already had in the business.

I tried again to persuade him; in a detailed plan I wrote on how we could roll out the UK model across the US and worldwide.

Yet again, he dismissed it out hand, though he produced a cut down version that each region could try to implement themselves. Suffice it to say; it did not work.

Anyway, shortly after this Westcon decided to try and float the business on the New York stock exchange and after advice from their corporate finance advisors, issued orders to all country managers to reduce costs by 10%.

For Richard Chilver, this came as a real shock as the UK was the most successful region, not only beating its sales targets but well surpassing its profitability goals.

He realised quickly that to meet these savings targets he would have to shed some staff and the easy way to do that was if I was one of those.

For me it was actually a relief. I felt I had achieved everything that I was going to with Westcon, I had been renting houses and flats in Reading and Maidenhead during the week for 4 years and I needed a new challenge.

So, in 2000, I was made redundant from Westcon, moved back home to Manchester, and started my new company IT Reality.

The 2000s

Cloudy and Personal

Introduction

Before I pick up the story of the development of IT in the 2000s, I would just like to explain my position at the time, which is relevant to my insight into how the industry developed.

As you may remember, I finished the 1990s, having been made redundant from Westcon and pondering my next move.

Well, I decided to go back to my original plans from 1994, before they were derailed by my involvement with Volante and subsequently Westcon and set up my consultancy practice, IT Reality.

Within hours of leaving Westcon, I was getting phone calls from all kinds of companies offering both senior executive and consultancy roles. However, I took a few weeks to evaluate what I really wanted to do and took advice from my ex-colleagues and the likes of Jens Montanana.

What I realised was that I wanted to stay at the heart of the industry but wanted to be independent, I wanted to work for myself but still affect the IT industry in a positive way.

So, I decided on a dual strategy, build my consultancy practice IT Reality, and start a career as a writer and commentator on the industry.

There was a real danger in this strategy in that companies I approached about consultancy business might be wary of my role as 'journalist'. In fact, over the years I did lose some consultancy work due to my role in the publishing arena but overall, I gained more credibility and standing from the research I did to produce the in-depth articles, and I ended up delivering key-note speeches and hosting events for lots of the companies I was working with.

So started the most enjoyable 15 years of my career. I did a broad range of consultancy projects helping vendors, distributors, Systems Integrators and Managed Service Providers launch new products and services, restructure their operations or just challenge their ideas and business plans.

In the publishing arena I wrote articles and features for Channel Business, Comms Dealer and IT Europa magazines and organised and hosted conferences and awards events across the UK and Europe. Some of which, like CommsVision, set new standards for the industry.

Whilst hosting these events and doing interviews for the magazines, I got to meet some of the IT industries' most eminent people and question them on their views and opinions of the developing technologies and the marketplace.

At the awards events I hosted I got to work alongside some of the most talented comedians in the UK, name dropping, Michael McIntyre, Ronnie Corbet and Sandy Toksvig.

All in all, this consultancy and journalistic work gave me a broader and more in-depth view of our industry.

So, let's get back to the story.

The 2000s started slowly as far as new product or technology announcements go, everyone recovering from the Y2K bug fears and

really getting to grips with the all the new technology they had implemented during the rapid expansion of the 1990s.

However during this period there were lots of developments going on in the background in vendor land that would have a major impact on IT developments over the next two decades.

From 2003 onwards these developments started to appear and the IT industry was catapulted into a period of change equal to or exceeding any previous era. By the time I retired in 2015, the IT industry encompassed every aspect of our daily lives at home, at work and on the move.

So, what triggered this new era of computing?

Well, it started in the data centre.

You may remember that as the 1990s progressed, the speed of processors on servers in the data centre was causing a major issue of heat dissipation and thus a limit to the number of servers per rack.

There was in parallel the issue that as processors got faster, there was not an equal performance increase in the applications they were running.

Basically, we had a productivity issue in the datacenter that was starting to pose major application deployment problems for all types of organisations.

The solution to these issues came from two fronts in the early 2000s, multicore processors and Virtualisation.

Multicore processors, where a single microprocessor could process instructions in parallel through multiple cores, enabled manufacturers to reduce the speed and thus the heat generated, whilst maintaining the processing throughput.

Almost overnight datacenters could double and treble their capacity of servers with no increase in floor space or air-conditioning.

Multicore processors had an even greater effect on PC users in allowing laptops to match the performance of desktop computers, enabling them to work from anywhere as though they were at their desk.

At a corporate level the next innovation, virtualisation, had an even greater effect on the performance and productivity of the datacentre.

Virtualisation had been around in the mainframe world since the mid 1970s. IBM was the first to implement it to use the full capacity of their mainframe processors.

Effectively, they created virtual machines where instead of the operating system running directly on top of the hardware, an abstraction layer of software sat between the operating system and the hardware. This enabled multiple versions of the operating system to run on the same hardware. Thus, maximising the usage of the existing mainframe processing power.

In the early 2000s, a new company, VMware, would do the same for the modern datacentre.

VMware had calculated that a typical server running Windows or Linux was only using about 20% of its core processing capacity running a typical application. The rest of the processor time was waiting for responses from other parts of the system.

They realised that if they created an abstraction layer for the server, a hypervisor, they could run multiple versions of Windows and Linux on the same server, moving utilisation of the hardware from 20% to 90%.

VMware also produced a management suite of software that allowed monitoring of performance of individual servers, even allowing

dragging of live virtual machines from one server to another to improve performance.

This ability to manage the whole virtual machine environment was extended over the next few years to a strategic view of the whole datacentre called Virtual Architecture.

Virtual Architecture defines the relationship between the physical servers and the Virtual Machines and encompassing virtual networking and virtual storage. This enables the datacentre manager to reduce costs by utilising all the hardware more efficiently, improving the scalability of the datacenter, and partitioning the datacenter for increased security and reliability.

Effectively multicore processors, virtualisation and the virtual architecture were the enablers for the cloud computing that we know today.

Communications catches up.

Outside of the datacenters, there were a number of emerging communications technologies that were also to become fundamental to both Cloud Computing and the evolution of IP Telephony and videoconferencing.

The first of these was MPLS, which over the first few years of the 2000s started to replace Frame Relay and ATM as a faster, more manageable and reliable alternative.

MPLS, using variable length packets, was not only faster but also allowed carriers and their clients to provide differing service levels for data, VoIP, and video.

MPLS became the gold standard for corporate WANs over the next decade, ideally suited for real-time applications needing consistent Quality of Service.

The only challenger for MPLS during this time was Metropolitan Ethernet (MAN), a high-speed, cost-effective service that extended Ethernet technology across a city or region, connecting business sites, data centers, and internet service providers.

It enabled high-capacity, scalable bandwidth up to 100 Gb over local fibre for WAN and cloud connectivity.

The pioneer of Metro Ethernet in the UK was LINX (London Internet Exchange) who in 1999 offered gigabit Ethernet connections to local ISPs and major corporates.

This started a race to lay fibre across the UK and particularly in Metropolitan areas to meet the demand.

Start-up, highly financed businesses started laying dark fibre everywhere without yet having customers, speculating that there would be an explosion as the corporate communications needs and the internet grew.

I remember talking to a friend who worked for Lucent, one of the world's largest manufacturers of fibre at the time, and him commenting to me that they just couldn't meet the demand.

However, for many of these start-ups, it all was about to come crashing down.

I remember getting a call out of the blue from an intermediary who had been asked to find a buyer for a dark fibre ring around London that a major energy company wanted to sell.

I was astonished to hear that they only wanted £1 for the whole infrastructure. I asked why I had been approached, and the intermediary said that he had heard I had lots of contacts across carriers and ISPs who might be interested.

So, I rang an ISP who I knew was looking to expand rapidly, to be met with a guffaw, before he explained what was happening.

It appeared that someone, speculation that it was BT was never confirmed, had rung around local authorities notifying them that they could charge business rates on all the dark fibre being laid throughout their boroughs.

Underground fibre infrastructure was treated as rateable plant and machinery, meaning it contributes to the rateable value of a network and is liable for business rate tax. (BT, I believe, had an exemption from this tax as the government wanted it to invest in its infrastructure)

It seems that the company selling the dark fibre ring around London had received bills totalling £24m per year from these local authorities even though they had not yet lit up any of the fibres.

This was happening right across the UK, and suddenly there was a fire sale of these early entrants who were snapped up by the existing national carriers for 'peanuts'.

If this had not happened, we could probably have reached the level of fibre deployment we have today, 10 to 15 years ago. Ofcom has a lot to answer for.

It took until 2017 for the government to give a 5-year 100% tax holiday on business rates for new full-fibre infrastructure to encourage its roll out.

That holiday has now ended, and these companies are thus subject to a 'Fibre Tax'. Though companies only start paying once the infrastructure is complete, there is still an issue that once dark fibre has been installed; it can be ratable even though none of it is lit.

Software defined networks

Though MPLS gave organisations the ability to handle a range of data, voice and video traffic over their wide area networks, by the 2010s it

was starting to be seen as too rigid to cope with all the new applications that were running across it.

So emerged the SD-WAN (Software-Defined Wide Area Network) in 2014, a flexible, cost-effective, internet-based networking approach optimised for cloud applications and agility.

SD-WAN acts as a software overlay on an organisations multiple WAN connections, intelligently routing traffic across links that are most appropriate for the application.

SD-WAN is ideal for distributed, cloud-heavy enterprises, while MPLS is suited for real-time applications requiring consistent QoS.

Always on communications.

Probably the most obvious change in communications technology in the 2000s is the introduction of Broadband.

Launched in the UK in 2000, Broadband changed our connectivity to the internet and corporate networks from dial-up to always on. We went from squawking modems to silent ADSL routers in rapid time.

And though ADSL broadband had a much faster download speeds than upload, it suited most of our needs in the early 2000s. We went from 9600 baud modems to 512k baud broadband. Brilliant for internet access and most business applications and by June 2005, broadband connections had overtaken dial-up in the UK.

However, because we were using the existing copper infrastructure for the first decade of the 2000s, it was only possible to offer companies a synchronous broadband version called SDSL, running at 2Mbps, for applications like video conferencing, in metropolitan areas where the copper wire distance from premise to exchange was low.

Companies wanting to use video conferencing more broadly at that time had to justify the costs of leased lines as well as the costs of specialist equipment and software.

It wasn't till the role out of FTTP (Fibre to the Premises) in 2011 that we started to see the proper uptake of video conferencing at a corporate level.

I remember in the mid 2000s consulting for an ISP who was trying to justify a video conferencing link between the US and UK offices for an American bank. The cost for the leased line in the UK was quoted twice the cost of the transatlantic connection.

It wasn't just this ISP who was running up against the cost of local connectivity for VC. Cisco had just launched their TelePresence product in the UK and had the same problem, so had Noel Edmonds, of Crinkley Bottom and Mr. Blobby fame.

Noel had put together a group of investors who planned to install video conferencing booths in all major towns and cities across the UK, but the whole business plan was failing due to the cost of synchronous connectivity.

So, we arranged a meeting with BT at Cisco's UK office to try and persuade BT to broaden their roll out of 2Mbps SDSL to stimulate the VC market in the UK.

Despite spirited presentations by Cisco, Noel, the ISP and myself, BT would not budge. I guess they felt it more important to protect their profitable leased line business than encourage new technology like video conferencing.

The frustration with the speed of roll out of new communications technology in the early 2000s was palpable across all industries. So many projects were delayed or never deployed because of these delays, and it really hurt the UK economy.

However, there were lots of other things going on at the time that really accelerated the uptake of IT technology and spread its adoption from corporate to personal use at an amazing rate, opening a new era of computing.

Cloudy, Personal and Mobile

As with all the other periods in the history of IT, the 2000s had many developments happening in parallel that eventually came together to define the new 'epoch' of modern computing.

I have described how the underlying technology in the datacenter, the network and in communications in the early 2000s laid the foundation for a new way of computing, but it took massive strides in the way software was developed and marketed, the merging of voice and data from infrastructure to applications, and the launch of the first mobile personal assistant to create the world of computing we all know today.

SaaS and SOA

So, let's look at the first of these, the evolution of software from device dependent to Software as a Service.

In previous sections I have described how the industry was dragged away from its dependence on proprietary versions of operating systems and software to a world of Open-Source software. By the mid 2000s this movement had achieved a critical mass with over 90% of companies across the world apparently using open-source code, driving innovation across all types of industries.

Alongside the open-source movement, there emerged a new way of constructing software applications that was to be fundamental in

enabling this new era of computing, Service-Orientated Architecture (SOA).

SOA was a new software design approach where, instead of software being developed as a single monolithic unit, applications were created using modular software components or services. These services provide business functions that can communicate with each other across platforms and languages.

A typical example would be where several business processes across an organisation needed to authenticate users. Instead of each application having its own authentication process, applications would share that authentication service.

It is hard to describe how important SOA has been in the way applications are developed and deployed in today's world, suffice it to say it underpins the way all modern software applications function.

As well as SOA, there were several other trends, such as Agile Software Development and Dynamic Scripting Languages that underpinned the software revolution that was going on in the early 2000s.

I am not an expert on any of these new trends but got heavily involved in discussions about them and their impact when I started working with IT Europa, part of the BPL publishing group.

Alan Norman, the MD of IT Europa at the time, was working with the European Software Association in broadening their influence across the European IT channels. As part of this IT Europa partnered with the ESA to run events across Europe.

At these events Alan would present on the developments in the IT and software markets across Europe, and I would present and host panel discussions on technical issues.

Out of these sessions emerged a theme which was to change the whole software industry and the way we all consumed applications, Software as a Service.

Software companies across Europe and the world were being driven to change their business models to meet the way organisations wanted to deploy and consume software applications.

The combination of virtualised datacenters, always-on communications, and open-source developments meant that the way software companies charged for their applications did not meet what was being asked for by their customers.

Traditionally software companies charged on a per server basis with stepped pricing based on the number of users. In the case of desktop applications, it was often in blocks of say 5, 10, 20 or 50 users.

Both pricing systems were now being challenged as companies wanted the flexibility to deploy applications distributed across multiple servers and to users who could be located anywhere using a whole range of desktop and mobile devices.

To meet this challenge was not a difficult technical issue for software companies and a lot of the early discussions at these events was all about the best way to develop their applications to run across a virtualised architecture and how to create what would eventually be called a cloud architecture.

The size of companies attending these sessions ranged from small business software developers to major multinationals.

At one of these events in Paris, I hosted a panel that included technical directors from Microsoft, Oracle, Salesforce and Amazon. It was probably the easiest and most energetic session I have ever chaired at such an event.

The audience included several hundred ISVs from around Europe, all who wanted to know how these major software companies planned to roll out their applications as 'Software-as-a-Service'.

It turned out the discussion was more about the business model of SaaS and its implications for the software industry than a technical one.

As many pointed out, switching from selling software as an upfront capital expense per server deployment to selling monthly subscriptions on a per user basis could have major cash flow implications causing many companies to fail.

Though ISVs knew they had no alternative if that is what the user wanted, there was a reluctance to move overnight to a new model.

What smaller ISVs devised was a hybrid model selling 'on premise' solutions alongside hosted solutions. After initial panics they had realised that not all their customers would want a hosted solution; many were happy to keep their IT solutions in house until they trusted cloud based or hosted applications.

The biggest issue these ISVs found was in house. How do you incentivise your sales force to balance the sales of both types of applications. Selling the on-premises solution came with a bigger up-front commission payment whereas the monthly charging model was easier to sell as the customer had no up-front costs.

This issue was multiplied if you sold through channel partners.

For the major ISVs this was an even bigger issue. Microsoft, who dominated the desktop office automation market, took until 2010 to launch their subscription model Office 365.

But everyone knew the danger of not embracing the Software as a Service model after Salesforce totally ripped apart the CRM market following the launch of the company at the beginning of 2000.

Though most large companies had their own CRM applications linked to their ERP systems, they rapidly found their sales and marketing people using Salesforce's hosted CRM system because it was better than the in-house system. Employees were even paying the

monthly fee themselves as it gave them such an advantage in their markets.

The use of Salesforce was rapidly brought in-house to ensure the security and integrity of the data. However, it taught everyone a lesson. Embrace cloud computing and Software-as-a-Service or suffer the consequences. This applies whether you were a major software company, an ISV or an end user.

The Cloud had arrived.

The merging of two worlds

Having been totally immersed in the IT world since the beginning of the 1970s, I had never really taken much notice of the voice industry until I launched the first IP Telephony product, Network Alchemy, for Westcon in the late 90s.

It was obvious to me straight away that I had entered a parallel world that had a different set of standards, some major multinational non-IT vendors and a whole channel of resellers who I had never met before.

It was a self-contained and very prosperous community who valued what they had built since deregulation in the mid 1980s.

To this community I was an interloper proposing a thing called Convergence, where the IT and telephony worlds were to merge as one.

In fact, it was a role I took up soon after leaving Westcon which would put me at the heart of the debate about the Convergence of these two worlds.

Within days of leaving Westcon, I was contacted by John Garrett, editor of Channel Business Magazine, part of the BPL publishing group, to ask if I would be interested in writing a Convergence section of the magazine to educate the IT channel on the technology and the business opportunities in this new voice world.

What a great opportunity this represented. Not so much financially, as journalists are not paid particularly well, but it gave me access to a whole host of new contacts.

The convergence message was one being pushed very strongly by major IT vendors from Microsoft to Cisco who saw an enormous new business opportunity.

Suddenly I was speaking with very senior executives at these companies and getting an insight into where they saw the market evolving on the back of the developments in IP Telephony.

In my articles for Channel Business, I attempted to explain not just the technical issues around these two converging worlds, but the business opportunity it represented.

It took a few years before Convergence really started to happen as the traditional IT channel learned about how to position themselves in the market and learn a whole new set of skills.

It did not help that the traditional voice channel and many of the PBX manufacturers fought a major battle to keep these interlopers out of their lucrative market. They kept trying to muddy the waters claiming 5 x 9s reliability of a traditional voice PBX against the unreliability of Windows servers performing the same task in software.

I remember writing an article at the time explaining that the power to most PBX systems in the UK came through a 13amp plug socket in the wall. I asked whether the likelihood of the plug being kicked out by accident or the cleaner unplugging it to replace with a kettle to make their tea was considered when calculating this 5 x 9s reliability.

I also explained how, in theory, using an IP Telephony server and redundancy built into the network it would be possible to exceed that 5 x 9s reliability.

Still the battle raged on with the two camps miles apart. Even vendors such as Nortel who had both traditional and IP Telephony products were loath to put their name to one architecture over the other.

At this time, it just so happened that BPL publishing had just brought on board a magazine, Comms Dealer, whose readership was these PBX dealers who were fighting this rearguard battle.

Comms Dealer's publisher Nigel Sergent knew this channel intimately and slowly educated me about its structure, the characters within it and the driving forces.

It was obvious this was far more of a community than the IT channel. They had fought a battle together over the years to overcome BT's dominance of the industry and forge businesses from scratch.

There was no way they were going to lie down and let the IT channel take over their telephony world.

There was obviously a learning curve here that we all needed to go through to make Convergence work because all battles result in casualties, and there should really be positives for all if we could avoid conflict.

To do our bit to bring the two worlds together the editor of Comms Dealer, Stuart Gilroy, asked me to contribute articles to his magazine to explain to his channel the business opportunity of IP Telephony and how to get involved.

We put on roadshows and events independently, and with vendors to show what awaited them by embracing convergence.

Slowly but surely the message started to get across to both channels that there was a new business emerging where they all could play and create additional revenue.

To accelerate the process, however, we felt that we needed to come up with something special to ignite, challenge, and stimulate the market.

Chris Boeree, the chairman of BPL, felt that as the publisher at the heart of this revolution we needed to create an event for the CEOs of these channel companies that showed the strategic reason for embracing convergence, not a technical one.

We sat down as a group and came up with a new event, only for CEOs/MDs, called CommsVision.

Over the years, CommsVision would become the most successful and long running event in the new ICT industry.

However, to achieve this we had to make the first event a real eyeopener for all attendees and sponsors.

We agreed quickly that to attract CEOs and MDs the venue was key. It had to be a place that they would all want to go, and it had to be away from any major city, particularly London, where they might want to combine it with other meetings.

Through his contacts Chris Boeree secured Gleneagles as a venue, and we set about defining a structure for a 3-day event that would both attract this prestigious audience and keep their attention.

First and foremost, however, we had to attract sponsors who were prepared to put up significant funding to make the event work at so expensive a venue.

Nigel Sergent knew all the major vendors from the voice side who were vital to the success of the event, and we hosted them all at a dinner in London where we pitched our proposal.

Luckily, they all bought into it and we had a starter.

Next, Chris and I approached the data vendors who were desperate to break into the convergence market, and we secured the two biggest Microsoft and Cisco.

So now my job really started, getting the content ready that would both challenge and excite an audience of CEOs and MDs.

I was determined that on the main stage there would be no company pitches; those were restricted to organised boardroom style sessions and one-to-one meetings that could be pre-arranged with delegates.

I spent hours explaining to each sponsor what I wanted them to say on the main stage; some got it right away, and others needed a bit of persuading.

I remember having an hour-long conversation with the Cisco speaker, as he travelled across Texas. He got it immediately and came up with a host of ideas that he incorporated into his presentation.

I structured the presentations so that after Nigel and myself introduced the event and its aims after lunch on day 1, the two data speakers from Microsoft and Cisco would lead the event. Leaving day 2 down to the traditional voice vendors and then panel discussions involving both voice and data channel partners.

Both Microsoft and particularly Cisco really set the scene as to where convergence was heading and why it was so strategically important to them and why it should be to the delegates.

Their presentations shook up the day 2 speakers so much that the first 2, from Siemens and Nortel, spent the night rewriting their presentations and liaising with their head offices, getting permission to talk about their new IP Telephony products they had in the pipeline.

Their two presentations were exceptional. It is amazing what you can do when your back is against the wall and the world you were comfortable with just got stood on its head.

This awakening for the voice vendors did not stretch to some of the audience that first evening. I had arguments with several at the dinner table and in the bar afterwards who felt that this was all fantasy and wouldn't happen.

I was so angry that they weren't listening that my intro to day 2 included me laying into the audience and telling them that if they didn't embrace this new world their businesses would not be around for very long.

That came to fruition for quite a number of them.

Those that 'got the message' prospered with many merging or buying competitors they met at the event and growing to be significant players in the new Managed Services world. (I will come to Managed Services shortly.)

I believe that CommsVision was a major catalyst for accelerating Convergence and the adoption of IP Telephony in the UK.

So many traditional voice vendors had been on the sidelines prolonging the life of their old very lucrative telephony products at the expense of moving the industry forward.

It took outside pressure to kick start this revolution.

Over the next few years many other events sprang up around this topic as vendors, distributors and both channel communities got to grips with this business opportunity.

Though the word Convergence is rarely used now when talking about this period, it was hugely important and caused a seismic shift in the way we all use IT today.

This convergence was more than just being able to use your PC for taking or making calls, or running telephony over IT networks, it resulted

in a complete rethink on how applications were developed to improve an organisations performance and productivity.

It started in the call centre and CRM world by integrating telephone calls, texts, and emails into a complete customer relationship environment.

This then extended across all applications in the IT world, blending to create the new ICT world of work today.

The arrival of a real personal assistant.

Amongst all this going on with cloud computing and convergence, probably the biggest 'happening' of the first decade of the 21st century was the launch of Apple's iPhone in 2007.

Suddenly from almost nowhere people had in their hand a 'Star Trek' communicator, but with a touch screen, internet connectivity and a host of personal and business apps.

The iPhone combined all the functionality of the Compaq iPaq PDA, personal digital assistant, launched in 2000, with the functionality of a phone and a digital internet router.

The iPhone almost overnight killed off the emerging PDA market and at the same time created a new definition of Smartphone, triggering a new 'app economy'.

Though earlier smartphones had been around for a few years, they lacked a common operating system, so each vendor had to encourage software companies to write apps to their standard. Reminds you of the UNIX world of the late 1980s.

Apple stole a march on all competitors because they introduced the iPhone as the next step on from their amazingly successful iPod, personal music companion.

They combined the app store for music with personal and business applications that took the market by storm.

I remember buying one of the first iPhones and at the next CommsVision event standing up on stage saying that this device was going to change not only telephony but the way we all communicate with each other and the world of computing.

Within 3 years, the major sponsors of CommsVision had changed from telephony companies like Avaya and Nortel to the likes of O2 and Vodaphone. The mobile revolution was truly with us.

Final Maturation of the channel

I have recounted throughout this book the evolution of the channel from agent in the 1970s, through dealer and reseller during the 1980s to Systems Integrator in the 1990s.

But there was a final stage to Managed Service Provider that completes the channel's evolution.

The move to hosted and cloud computing during the 2000s meant that the channel's revenue streams switched dramatically from hardware and software capital equipment sales with support services as an add on, to a recurring revenue stream of the whole computing, telephony and mobile services they provided.

So, the modern role of Managed Services Provider was born.

The term MSP had been around for many years but had been restricted to referring to those companies who specialised in IT maintenance services.

I wrote an article for IT Europa in 2009 explaining why I thought that the term should be used for defining the modern channel, who were starting to sell everything as a service.

The article got such traction that we inaugurated the first Managed Services Summit in 2010 to bring together all the major players in the industry from Microsoft and Amazon to major Systems Integrators and the broader channel community.

To ensure we got all the relevant players to the event, Alan Norman, MD of IT Europa, approached one of our publishing competitors Angel Business Communications, who focused on the datacenter and hosting market, to combine our resources to make the event a real success.

The Managed Services Summit had an instant impact, and along with several other start-up events really put the term MSP on everyone's lips.

In a 2024 survey by the UK Government, it was recognised that Managed Service Providers were the primary channel for the provision of IT in the UK.

The survey also identified that there were 11,492 active MSPs in the UK, employing an estimated 294,340 full-time employees.

The study also claimed that the annual growth rate for UK MSP companies over the previous 5 years was 12%, a period that included the covid effect, and that total annual revenues for these MSPs equaled £52.5bn.

From 1 man band agencies of the late 1970s to being the main delivery channel for IT in the modern world, the channel needs to take a bow.

Summary of 45 years in the industry

I thought that this was a good time to end my history of IT in the UK. As to go on any more about the developments was getting too close to the present day and no longer history.

I retired officially in 2015 but continued to support the events that I helped establish for BPL up to 2025, by introducing speakers and hosting panels as well as judging at awards events.

This helped me keep abreast of developments in technology and the channel and stimulated me to write this book to ensure the history and evolution of IT in the UK was not forgotten.

I have thoroughly enjoyed my career in the IT industry and met and worked with a whole host of different characters. There can be no other industry where so much change happened in such a short time.

I have mentioned several extraordinary characters I have met and worked alongside over the years, but there are many other great people I have not been able to include. I apologise to those.

This is a very personal view and insight into what is now a huge industry. My perspective on the evolution of the industry is not from an academic viewpoint rather from where I was involved.

Hopefully this account will stimulate others to cover some or all of this period from their own perspective. There are whole segments of the industry where I have no experience and feel that others should contribute.

In doing my research I found that much of the information in Wikipedia and vendor history sites was dull time lined data and even some of that was patently wrong. So, along the way I have liaised with ex colleagues to ensure that I was accurate in my recollections.

However as many of those had a similar perspective to me, I cannot guarantee everything is factually correct. As one of my friends pointed out, ‘we can all go to the same event and each come away with a different view of what we saw and heard’.

I hope you enjoyed my journey through the evolution of IT in the UK and I look forward to reading your own experiences.

Final Outtakes

Security and AI

Due to their current importance, I have deliberately not covered the top two topics of the day, those of Security and AI.

Over the last 10 years, security has risen to the top of MSPs' issues and opportunities. With the explosion of cloud computing, a distributed workforce and the Internet of things security has become the most important issue for all organisations.

At the Managed Services Summits over the last 5 years, about 2/3rds of the vendor stands have been taken up by security companies, reflecting its importance.

So important, that the government is now involving MSPs in developing strategies and proposals to improve the UKs cyber resilience.

The world of AI has appeared and is developing at such a rapid scale that again it is not an appropriate subject for history.

Except that at CommsVision and the Managed Service Summit quite a few years ago I introduced the topic but with a heading of Big Data. We also introduced IBM Watson as an AI service to take Big Data and create the types of applications we are seeing today.

We were right in our forecasts, but it took new processing technology from the likes of NVIDIA and new software products like ChatGPT, Claude, Gemini and Copilot to bring it to the masses.

Why I love the channel

It may have become apparent while reading this book that I have a great affinity to the UK IT channel having been involved in it since its early days in the late 1970s.

I suppose my love of the channel started at my very first sale on my first day as a salesman for ADDS having moved across from engineering manager.

It was around lunchtime on my first day when I got a phone call from Chris Lynas, the owner of the Marine Court Hotel in Ayr, Scotland.

He was looking for a stable computer platform to run his hotels front and back-office system that had been written for him by a software company he had shares in.

He had heard that our MultiVision computer was much more reliable than the Superbrain computer he was currently using, and he wanted to come down to Manchester that day to recompile the program and test it.

He turned up at around 3pm in his Porche 911 with his partner from the software company and immediately started work recompil-

ing the program. After a few hours of testing, he said he was happy and wanted to buy the machine.

I told him I would get a system built and configured for him the next day and ship it up to his hotel. This was not good enough, apparently as he needed it to check out guests from his hotel the following morning. He wanted our demonstration machine as he was confident that the machine was good.

He also wanted to pay cash as he had it in his pocket. We eventually agreed on £4,300 and after borrowing £80 off his software partner, we concluded the deal.

After stuffing the MultiVision and his old Superbrain into the Porche, no easy feat, I offered to buy them supper before heading off to Ayr. I spent the whole meal with my briefcase, stuffed with £4,300 worth of notes, between my legs.

The next time he had sold a system, to another hotel in Scotland, he rang me to arrange to collect it. I told him this time he had to pay by cheque as he had caused chaos at our office last time because we only had a local petty cash account.

This he agreed but wanted to collect later that day. I got a call an hour or so later from his hotel front desk to say he would be arriving in 1 ½ hrs. I realised very quickly that even in a Porche you could not get from Ayr to Manchester in that time. No said his receptionist, he is flying down by private plane and could we meet him at Manchester Airport.

It was like a drug deal, exchanging two parcels for an envelope on the edge of the runway.

I have many other great stories of dealing with Chris, but he was not the only character I encountered in those first few years as a salesman. In such a fledgling market it took real characters to build a business, and they seemed to gravitate to me.

I once got a call from our accounts manager to ask why all my customers were 'crackpots', and my response was that it took 'crackpots' to create a business from nothing.

I think it was my empathy with the founders of these early companies that helped shape me and my career. Helping them create sales through marketing and sales support and then ensuring they had sufficient credit facilities was fundamental to many of their successes.

Many of those early customers became great friends over the years and helped me be successful in my future ventures.

In support of the channel, I occasionally came into conflict with vendors who treated the channel as a necessary evil. I remember once being commissioned by a major vendor to come and talk to their salesforce about how best to work with the channel.

It became obvious very quickly that many of their salesforce saw themselves as superior to the channel and weren't listening to my ideas.

Eventually I got really upset and called them out on their attitude. I told them that just because they had a shiny suit and BMW didn't entitle them to feel superior. As I pointed out, most of their successful channel partners were driving around in Aston Martins, owned their own businesses and would sell them for many millions when they retired.

They also had a choice of vendors and would only partner with those that helped them achieve their goals. Who is the mug here.

It seemed to work; I got paid promptly, and the vendor completely altered their partner program and support.

There were a few in the channel who I would happily have strangled if I could get away with it but overall, I have had a great relationship with the channel throughout my career.

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When writing this book I have tried to be as accurate about events and people as I can and I have tried not to disparage anyone, although my reviewers think I have been too kind to some.

I have used graphics in the book purely to illustrate products or periods of interests. I believe I have only used open source and royalty free images and there is no copyright infringement intended if I am mistaken. I have used one or two images I have purchased over the years.

This book is not for sale and is intended as an academic piece giving my personal view of the IT Industry.